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ORIGINAL ARTICLES.

THE DIFFERENTIAL DIAGNOSIS OF ULCERATIVE DISEASES OF THE PHARYNX AND THE LARYNX.*

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Diseases attended with ulceration and loss of tissue in the upper respiratory tract are productive of serious and often fatal results. Aside from malignant disease, there is danger in this locality from encroachment upon the lumen of the air-passages.

The onset of the few diseases capable of producing ulceration of the tissues of the pharynx and larynx is much the same. Should the disease process begin in the pharynx, the initial symptoms will be pain, or soreness of the throat, and interference with one of its functions of deglutition. Should the process begin in the larynx, pain again will likely be the first symptom and again interference with the function of the part—the voice—and consequently hoarseness. Inspection at this early stage would reveal a localized inflammatory process; hyperemia, tumefaction and impairment of mobility. It is seldom, however, that a case presents at so early a stage.

The diagnosis is almost impossible until a case is under observation for awhile and the character of the growth, the rapidity of its breaking down, the tendency to ulceration and other features are carefully noted.

Let us consider briefly the clinical picture presented in each of the various diseases attended with ulceration and then, if possible, emphasize those points most distinctive of each. Syphilis is perhaps the most common. This disease is peculiarly prone to attack mucous surfaces, and the locality under consideration offers no exception to the rule. We are not concerned with the superficial ulceration—the mucous patches and plaques which are all too common and present few diagnostic difficulties.

The gummy tumor is by all authorities regarded as the precursor of the deep ulcers of syphilis. It makes its appearance in the pharynx and larynx as a reddish mass, very soon becoming grayish in the centre and slightly elevated above the surrounding tissues. The intense redness of the mass shades into a fainter hyperemia of the surrounding tissues.

In the larger number of instances a very brief period intervenes between the appearance of the gummy tumors and its breaking down and ulceration. It is thus quite seldom that we are called upon to make a differential diagnosis at the stage of infiltration or tumor. Instances are upon record in which the appearance of

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the gummatous mass, its breaking down and the destruction of a large portion of the soft palate have occurred in the brief period of two weeks.

In the pharynx the most common site of ulceration is the postero-lateral walls. The process spreads rapidly to the soft palate and uvula, or the initial point may be the soft palate with extension towards the lateral walls. The tonsils also form a common site.

Gummy tumors and the ulceration succeeding them show little tendency to invade other tissues than those originally involved, *e. g.*, pharyngeal ulceration rarely extends to the naso-pharynx and never to the larynx. Laryngeal ulceration never extends to the pharynx.

It is true that we may, and frequently do, have separate involvement of the respiratory tract, *e. g.*, the nares and pharynx or nares and larynx. The point at issue is that we do not have an extension of the ulcerative process by contiguity of tissue. This peculiarity constitutes a very important diagnostic feature, totally unlike another ulcerative process with which syphilis is most likely to be confounded, namely carcinoma.

The deep ulcer of syphilis is the result of breaking down of the gummy tumor. We are concerned with the pathology of this process only so far as it enables us to have an intelligent understanding of the subsequent ulcer. We should know that the crowding together of a large number of infiltrated cells causes a choking of the circulation and consequent death of and breaking down of the central portion of the gummy mass. The appearance of the deep syphilitic ulcer is in many ways characteristic. It is clear cut and deep, covered with thick yellowish pus and shreds of necrotic tissue. An areola surrounds the ulcer and its edges are indurated. The tendency of the ulceration is to involve only that portion which was the seat of the original gummy tumor. This frequently involves a large surface, *e. g.*, the entire posterior wall of the pharynx or the soft palate and the uvula. Bosworth insists upon this tendency and believes that ulceration never takes place outside of the limit of the previously infiltrated cells of the gummy tumor. The tendency of these ulcers to disfiguring cicatrization, and the presence of these cicatrices constitutes a material aid to diagnosis.

Perhaps in no disease is the destruction of tissue so rapid and the resulting cicatrice so disfiguring as in syphilis. In the pharynx these disfigurements may be annoying and sometimes interfere with the proper function of the part, but it is seldom inimical to life. Similar conditions, however, do not prevail in the laryngeal cavity; here the cicatrization and contraction may be so great as to encroach seriously upon its lumen, necessitating tracheotomy; or bands may form, stretching across the cavity and demanding division or tracheotomy.

The gummy tumor, as it occurs in the larynx, is a reddish mass, situated in any portion of the larynx—the posterior wall, the false or the true bands, or the arytenoids. Among the first symptoms are hoarseness and sometimes complete aphonia. Later there may be dyspnea, depending of course, upon the encroachment of the growth upon the lumen of the cavity; and cough of a peculiarly harsh and smothered character. Here, as in the pharynx, the gummatous growth is exceedingly likely to break down rapidly into the deep syphilitic ulcer, but in this locality a gummy tumor may persist for a long time as such, if uninterrupted in its course by treatment. We are thus perhaps more often called upon to make a diagnosis in the early or gummy tumor-stage in this locality than in the pharynx, though by no means frequently.

Let us pass now to the next most frequent cause of ulceration in the larynx and pharynx, namely tuberculosis. In my experience tuberculosis of the pharynx is excedingly rare and the few cases that have come to my notice have been complicated with other evidences of tuberculosis, usually pulmonary. The early symptoms of pharyngeal tuberculosis are very much the same as those of syphilitic or other ulcerative condition, viz.: soreness of throat and painful deglutition. In cases of syphilis and carcinoma, however, these symptoms occur in a previously healthy and often robust individual. Not so in tuberculosis. Here the patient has been previously weakened by the pulmonary or laryngeal complaint and is in consequence pale and anemic and has considerable elevation of temperature. These

conditions may not obtain in cases of pure primary pharyngeal tuberculosis,—but such a condition is so rare, if it ever occurs, as hardly to be worth consideration.

The appearance that the pharynx presents when the seat of tuberculosis is about as follows: The mucous membrane is exceedingly pale and covered by thick, tenacious and ropy mucus. There may be several small spots of ulceration, the site of previous miliary tubercles, or two or more of these may have coalesced forming one good-sized ulcer. The ulcer is on a level with the surrounding tissues and does not present a punched-out or deep appearance. The edges are not clear cut but seem to shade gradually into the surrounding tissues. There is no induration or areola. The surface of the ulcer and the pharyngeal wall is covered by thick, agglutinated mucus, efforts to dislodge which give rise to much pain and annoyance. There is very little discharge from the ulcer.

When the appearances of the ulcer are considered in conjunction with the marked constitutional disturbance—viz.: hectic, high fever, etc., it does not seem as though the condition should present any very great difficulty in diagnosis. Should, however, the rare condition, primary pharyngeal tuberculosis present itself, the difficulty may be greater, but even under such circumstances the appearance of the ulcer is characteristic, and the differential points are well marked, as I shall show later on.

In the larynx the case is somewhat different. In the first place, primary laryngeal tuberculosis, though rare, is much more common than the same disease in the pharynx.

Again, ulceration of any character in the larynx is likely to be accompanied by constitutional disturbance so that we cannot rely too much on this feature, and while we may still regard constitutional symptoms such as hectic, night-sweats, etc., as favoring tuberculosis, they are not of such significance as in cases of pharyngeal tuberculosis.

Tuberculosis of the larynx, while not confined to any particular spot, is exceedingly prone to attack the interarytenoid space, and the base of the arytenoid cartilages, giving rise to that characteristic pear-shaped swelling which is due to edema of the arytenoid joints.

The ulceration, when seen, presents very much the same appearance as that already described as occurring in the pharynx.

The swelling of the arytenoids in many cases is so pronounced as to shield the inter-arytenoid ulcer from view.

As in the pharynx, there is the same accumulation of thick, agglutinated mucus the expulsion of which causes much difficulty and discomfort. One symptom not pathognomonic but very suggestive is severe pain in the ear and this is especially likely to be present should the ulceration involve the base of the epiglottis. The voice is peculiar. It is hoarse, sometimes aphonic, and there is often considerable phonatory waste.

The next ulcerative condition in the point of frequency is carcinoma. Carcinoma of the fauces is exceedingly infrequent. Gürlt reports but six cases of primary carcinoma of the tonsils in a total of 11,131 cases of carcinoma of all kinds. The first symptom of carcinoma is pain, which is of the same character as attends carcinoma in other portions of the body, viz.: lancinating, constant, often intolerable.

At first the pain is complained of during deglutition, but very soon it becomes constant and almost unendurable. Coincident with this symptom is stiffness at the angle of the jaw, rendering the opening of the mouth painful and causing difficulty in deglutition. Very early, often within a few weeks of the initial symptom, the cervical glands of the affected side become enlarged and painful.

The pain is referred to the spot affected and also, as in other ulcerative conditions of the upper respiratory tract, to the ear of the affected side. The intense boring, ever-present pain in the ear is often the chief complaint, appearing very early in the course of the disease, sometimes before the parts present any distinctive feature of the malady.

Indeed, instances are not wanting in which the ear has received treatment for a considerable time before the true nature of the affection was surmised. This, however, is a blunder impossible to any but a superficial or careless observer.

The presence of persistent sore throat,

accompanied by difficulty in deglutition and severe pain in the ear, in a person past middle life should put us on our guard, and we should at least suspect the presence of malignant disease.

All the symptoms enumerated rapidly increase in severity, and in the later stages deglutition becomes almost impossible from the pain excited by the act. The patient is loth to take food and confines his diet to liquids or semi-solid food. In consequence there is failure of nutrition—to which is added septic infection from absorption of decomposing detritus and we have the condition that gives to us the designation carcinomatous cachexia.

The progress of carcinoma of the pharynx is often exceedingly rapid—the growth may begin to ulcerate within three months from the first symptom. The entire course of the disease from the inception to death is covered by a period of from six to eighteen months.

Inspection of the fauces when carcinoma is present reveals a condition totally unlike that seen in any other disease that attacks this locality. Tonsil, soft palate and pharynx are involved with a frequency in about the order enumerated.

The course is so rapid, however, that unless a case is seen early all of these structures may be involved and serious difficulty arise in determining the original site.

The tonsil is the most frequent starting-point. I recently had the privilege of observing a case from the very incipiency. The symptoms detailed, and the appearances presented are drawn largely from a study of this case. The tonsil at first presents a dark-red appearance, with a grayish-white spot in the center. It seems as though the mucous membrane was pushed outward by some body imbedded in the tissue of the tonsil. The velum, the posterior wall of the pharynx, and all of the surrounding tissues on the affected side are hyperemic. The growth of this projecting mass is exceedingly rapid. Within a month it exceeds the confines of the tonsil and spreads over the surrounding tissues in a cauliflower-like manner. At this period there is no ulceration, though there is excessive vascularity. How unlike this to that disease with which it is most likely to be confounded, viz.: syphilis.

Within three months ulceration of the surface of the mass takes place. This ulcerative process is peculiar and characteristic. The ulcer is not a deep one, giving a gouged-out appearance to the mucous membrane such as seen in other ulcerative diseases. It seems rather to be a destruction first of the most prominent portion of the growth, and breaking down of the tissues adjoining the growth. As fast as the tissues at the margin of the growth melt away, the growth itself spreads over the part. While there is undoubtedly a loss of normal tissue the actual appearances presented is a substitution of an abnormal tissue in excessive quantity for the normal.

The growth spreads rapidly to the surrounding tissues, ignoring anatomic boundaries and attacking everything in its way. It very early involves the velum and the posterior wall of pharynx, extending upwards into the naso-pharynx and downwards, involving the sides of the tongue and the inner surface of the jaw. The destruction and the discharge of dead tissue are accompanied by more or less free secretion and a very disgusting and penetrating odor.

Carcinoma of the larynx is somewhat more frequent than carcinoma of the pharynx. Gürlt's tables showing 63 cases in a total of 11,131 cases.

The location within a concealed cavity and in the early stages the similarity of symptoms to those of other forms of ulcerative disease renders an accurate diagnosis extremely difficult. When, however, the symptoms are grouped together and all phases of the case, intra-laryngeal and extra-laryngeal, are considered, no insuperable difficulty will be encountered in the majority of instances.

Let us briefly consider the development of this form of carcinoma. The first symptoms are pain and impairment of voice. The former is of the same sharp, persistent and lancinating character that has already been adverted to—and here also the site of pain is frequently referred to one or the other ear.

The progress of the disease is rapid but not nearly so as is carcinoma of the pharynx. Indeed there are some instances upon record in which the progress of the disease has been exceedingly slow, and it is under such conditions that the greatest

difficulty in differential diagnosis is experienced. In the main, however, the progress of laryngeal carcinoma is rapid.

Very early, in consequence of encroachment of the growth, dyspnea occurs—also ulceration with hemorrhage occurs at an early period.

Dysphagia constitutes a distressing though by no means constant symptom. The odor attending a case of malignant disease of the larynx is peculiarly horrible and disgusting and when once recognized it is not soon forgotten. Some authors regard this odor as pathognomonic and claim to be able to diagnosticate a case from its presence.

I am quite sure, however, that cases of syphilitic disease of the larynx have come under my notice with odor so penetrating and disgusting as to exceed the odor from any other disease, and I must confess that my olfactory bulbs have not been trained to so high and sensitive a degree as to enable me to distinguish between these two very disgusting and intense odors.

Laryngoscopic examination early in the disease reveals the larynx the site of a growth, which may occupy any position in its cavity; the true or false bands, the arytenoids, or the posterior wall. Later the growth breaks down and we have an ulcer filled with necrotic tissue and giving forth an horrible offensive odor. Here, however, as in the pharynx, the ulcer is characteristic. It does not appear as a loss of tissue alone, but rather as a substitution of abnormal for the normal and ulceration of the former. In other words, it is growth accompanied by ulceration. This condition is very different from that presented by all other forms of ulceration —in which after the first stage has passed and the infiltrated tissues have broken down we have as the predominant, characteristic feature destruction and loss of normal tissue. There may be edema of the surrounding tissues but there is always a clear-cut, distinct and characteristic ulcer.

The least common ulcerative condition to be considered is that attending lupus. Lupus is an exceedingly rare form of disease in the larynx and pharynx. It is usually associated with a similar condition of the cutaneous surfaces and this constitutes an important feature in its diagnosis.

Lupus is very insidious in its approach and of an exceedingly chronic nature.

It consists principally in an infiltration of cells and thickening of the tissues, with later a slow breaking down or rather absorption. The ulcerative process is so slow that one can seldom distinguish a true, clearly defined ulcer. We know by the results, namely, absorption and destruction of tissue, that some such process has taken place. At the same time that this process of ulceration is in progress there seems to be an effort of nature to heal over the parts affected; in consequence there are numbers of unsightly and distorted cicatrices. The result is that the part appears lumpy and distorted.

The palate and the uvula are the most frequent sites.

The uvula presents an irregular and distorted appearance and there is much loss of tissue, so that the uvula appears as a mere knob.

Rarely can well-marked ulceration be detected. In consequence of this peculiarity of the ulcerative process there is no discharge of pus or detritus. The subjective symptoms are those of discomfort rather than pain. Deglutition and phonation are in a measure interfered with, in proportion to the amount of tissue involved, and in accordance with the locali-

In the larynx lupus presents symptoms only of interference with the proper function of this organ. The voice is altered in character or is entirely lost. Dyspnea sometimes occurs, though this is rare, for the reason that the disease consists essentially in a destruction of tissues, with no tendency to the production of new abnormal tissue.

Laryngoscopically there is first an infiltration of the tissues and later a gradual absorption, almost never does one observe well-marked ulceration.

We have here passed over hastily the chief causes of ulceration of the pharynx and larynx. In the main the symptoms of each condition are so distinctive as to make the diagnosis comparatively easy. Cases occur, however, in which it is necessary to group the symptoms and others in which a conclusion as to the nature of the disease is arrived at only by means of application of the therapeutic or the microscopic test.

Perhaps the two diseases most frequent-

ly confused are syphilis and tuberculosis. Carcinoma in its early stages offers many difficulties in diagnosis. But a very short time, however, is required to clear up the matter. As to lupus, the history, course and appearance are so essentially different from those of the other forms of ulceration as to almost eliminate this condition from the group.

In order to more clearly recognize the dissimilarity of these four ulcerative conditions, individual and characteristic symptoms have in the accompanying tabulation been placed side by side. This mode of procedure will clear up the larger number of cases, but even this analytic method will leave a few cases doubtful. Fortunately we are dealing with an accessible locality and we can readily remove a portion from the surface or cut out a generous piece from the growth, bringing to our aid the microscope. Again, as between syphilis and carcinoma and tuberculosis the therapeutic test may be employed. While I never neglect to employ full doses of anti-syphilitic remedies in doubtful cases I have no great reliance on this method.

ULCERATION OF THE PHARYNX.

SYPHILIS:	CARCINOMA:	TUBERCULOSIS:	LUPUS:
Pain usually slight.	Pain, lancinating, severe, constant, often excruciating. In many cases referred to ear.	Pain severe; not constant; aggravated by efforts at deglutition or clearing the throat of inspissated mucus; sometimes referred to ear.	Pain slight, if any.
Ulcer clear cut. Destruction of tissue great. Appears very early in the course of the disease—within 2 or 3 weeks.	No clear-cut ulcer. Normal tissue replaced by morbid growth. Ulceration does not occur for 2 or 3 months after the appearance of growth.	Ulcer shallow and not clear cut, shading imperceptibly into the normal tissue; ulceration occurs very early.	Ulceration rarely seen, the process being rather marked by the absorption of tissue.
Profuse purulent discharge and necrotic tissue cover surface of ulcer.	Very little discharge covers the growth. When ulceration occurs the surface is covered by a thin sanious discharge.	The surface of the ulcer is covered by mucopurulent secretion and agglutinated mucus.	Little or no secretion.
Borders of ulcer indurated and hyperemic.	The growth is of stony hardness. An areola surrounds the growth, but no induration occurs until the parts are encroached upon by the growth itself.	No areola or induration.	Disease consists of a series of indurated nodules.
Ulcer rapidly destructive and extends deeply.	Quite rapid in its course; extends in all directions.	Erodes slowly and laterally, not deeply.	Exceedingly slow in course.
Ulcer confines itself to pharynx, rarely extends to naso-pharynx—never to larynx.	No anatomic boundary confines the growth; extends in all directions and attacks all tissues.	Confines itself to mucous membrane of pharynx; extends laterally.	May extend to larynx.
Cicatrices often present.	No cicatrices.	No cicatrices.	Cicatrices numerous.
General condition unimpaired.	Early in the course of the disease the general condition is good; later, however, the health fails rapidly.	General condition poor from the outset, indicating some grave constitutional disease.	General condition very slowly impaired.
Often evidences of specific disease in other organs.	No manifestations of previous disease.	Pulmonary and laryngeal manifestations.	Cutaneous manifestations previous to and coincident with the pharyngeal.
No fever.	No fever.	High fever.	No fever.
Rapidly improves under iodids.	The disease is uninfluenced by iodids.	Is not influenced by iodids.	Not influenced by iodids.
Sputum contains no distinctive morbid product.	Examination of sputum negative.	Tubercle-bacilli found in sputum.	Examination of sputum negative.
Microscopic examination of excised tissue reveals large number of small ronnd cells.	Microscopic examination of growth shows characteristic cells of the various forms of carcinoma.	Microscopic examination shows giant-cell tubercle-bacilli and other evidences of tuberculosis.	Microscopic examination very similar to that of tuberculosis.

ULCERATION OF THE LARYNX.

SYPHILIS:	CARCINOMA:	TUBERCULOSIS:	LUPUS:
Pain usually slight.	Pain constant, lancinating.	Pain in deglutition severe.	No pain.
Attacks any portion of larynx and ulcerates rapidly.	Attacks any portion of larynx and ulcerates more slowly than syphilis.	The favorite site is in the inter-arytenoid space or the base of arytenoid cartilages; ulcerates slowly.	Attacks any portion. ulcerates very slowly;
Is rarely seen in the stage of induration—the first evidence being a clear-cut, deep ulcer.	The first appearance is that of a new-growth occupying the laryngeal cavity—no clear-cut ulcer.	Usually the first appearances are small spots of induration, rapidly followed by great edema.	Nodular masses.
Some induration around the ulcer, but usually very little edema.	The growth fills or encroaches on the laryngeal cavity.	Great edema of arytenoids.	Little or no edema.
Ulcer extends deeply, often involving cartilage.	Growth extended in all directions, involving all tissues in its course.	Ulceration extends laterally but not deeply.	Very slow in progress; ulcer rarely observed.
Surface of ulcer covered by muco-purulent secretion and necrotic tissue.	Surface of growth covered by discharge.	Surface of ulcer covered by thick, muco-purulent secretion and agglutinated mucus.	Little or no discharge.
Mucous membrane hyperemic and injected.	Mucous membrane hyperemic.	Mucous membrane pale.	Mucous membrane injected.
Laryngeal stenosis not common until cicatrization occurs.	Laryngeal stenosis quite common.	Laryngeal stenosis rarely occurs.	Slight stenosis.
General health unimpaired.	Early in the disease no impairment of general health; later marked cachexia.	Health impaired previous to laryngeal involvement.	Very slight impairment of general health.
Frequent evidences of syphilitic disease in other tissues.	In primary laryngeal carcinoma no other involvement until later in the disease.	Previous and coincident pulmonary trouble.	Frequently cutaneous manifestations.
Rapidly improves under the iodids.	Iodids have no influence on the course of the disease.	Iodids have no influence.	Iodids have no influence.
Sputum contains no distinctive morbid product.	Examination of sputum negative.	Tubercle-bacilli found in sputum.	Examination of sputum negative.
Microscopic examination of excised tissue reveals large number of small round cells.	Microscopic examination of tissue shows characteristic cells of various forms of carcinoma.	Microscopic examination of tissue shows giant cell tubercle-bacilli and other evidences of tuberculosis.	Microscopic examination very similar to that of tuberculosis.

FRUIT EATING.

Each year people grow to appreciate more fully the value of fruit, and eat it, not as a luxury, but as a staple article of food. Fruits are nourishing, refreshing, appetizing and purifying, and consequently have effect upon the health and the complexion. Yet there are differences. Grapes and apples are highly nutritious. Grapes usually agree with the most delicate persons, for they are so easily digested. Nothing is easier to digest than a baked apple, taken either with or without cream. Oranges, lemons and limes are of great value as a means of improving the complexion, and they are especially good if taken before breakfast. Ripe peaches are easy of digestion and are fattening. Nothing is better to enrich the blood than strawberries, which contain a larger percentage of iron than any other fruit. Fruit with firm flesh, like apples, cherries or plums, should be thoroughly masticated, otherwise they are difficult to digest. The skin of raw fruit should never be eaten, and before eating grapes or any small fruit care should be taken to remove all impurities by washing. Never swallow grape stones. Stale fruit and unripe fruit should never be eaten, and very acid fruit should not be taken with farinaceous foods unless the person has vigorous digestion. —*The Sanitarian.*

PHILADELPHIA'S GAS SUPPLY IN ITS RELATIONS TO THE PUBLIC HEALTH—A COMPARISON OF THE INJURIOUS QUALITIES OF COAL GAS AND WATER GAS.

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I will premise my remarks by reading the resolutions adopted by the College of Physicians in April, 1888, as a result of an investigation by a special committee which had been appointed to report on the subject of water gas:

"WHEREAS, The College of Physicians of Philadelphia has learned that it is proposed to furnish the citizens of Philadelphia with illuminating gas consisting of two parts of coal gas and one part of water gas, a mixture which will probably contain at least thirteen per cent. of carbonic oxid; and

WHEREAS, In the opinion of this College the use of any illuminating gas which contains more than ten per cent. of carbonic oxid would be attended with very great risk to the health and life of the citizens of Philadelphia; therefore be it

Resolved, That the Mayor of Philadelphia is hereby petitioned that if in his opinion it be necessary to use water gas in connection with the illuminating gas, that great care be taken to render it certain that the mixture will at no time contain more than ten per cent. of carbonic oxid."

Illuminating gas has long been one of the necessities of modern life, and it is evident that for various reasons there is more or less danger to health and life from its use. All illuminating gases have connected with them the same elements of danger, but in varying degrees.

The subject has become most interesting to the citizens of Philadelphia because of the efforts, at present being made to lease the City's Gas Works, by a private corporation, which I understand purposes to relinquish the manufacture of coal gas, and to substitute illuminating or carburetted water gas in its place. As the composition and method of manufacture may not be known to all, I may say that water gas is the result of the decomposition of super-heated steam, breaking up into its component elements in the presence of coke or anthracite coal, burning at an exceedingly high temperature (the process being conducted at a temperature of from 1700° to 2000° F.). This results in the production of carbon monoxid, carbonic acid, marsh gas, hydrogen, nitrogen, hydrocarbons, with traces of various other gases. The gas thus produced is practically odorless, and while a splendid fuel gas, has little illuminating power. In order to render it useful as an illuminant, it is passed from the generators to a superheater in which it meets a spray of highly heated and partially vaporized oil. The oil vapor and water gas pass together into a second super-heater (or carburetter as it is usually called), the oil vapor being converted into a fixed gas. The oil vapor is mixed with the water gas, giving to it an illuminating quality depending upon the quantity of the oil gases or hydrocarbons taken up in the process. It will readily be seen that the resultant is really a mixture of a large number of gases, the chemic composition varying according to the materials used, the temperature at which the various decompositions occur and a variety of other conditions.

Coal gas and carburetted water gas are very much alike in respect to their variability in composition, but to compare the constituents of the two gases, I will quote proportions furnished me by Mr. Edw. H. Earnshaw, the chemist in charge of the United Gas Improvement Co.'s works:

	Coal-Gas.	Water-Gas.
Benzine vapor (C_6H_6)	0.4	0.5
Illuminating hydrocarbons	5.0	12.0
Carbon monoxid (CO)	8.0	31.0
Hydrogen (H)	47.0	17.0
Carbon anhydrid (Co_2)	2.0	3.0
Marsh-gas ($C.H_4$)	36.0	17.0
Nitrogen (N)	1.6	2.5
Total	100.0	100.0

* Read before the Philadelphia County Medical Society, November 10, 1897.

The variations between different specimens of gas are sometimes very considerable. The same authority informed me that in an analysis made at the Drexel Institute recently of the gas furnished there, tests showed the presence of 25 per cent. of nitrogen. There must thus necessarily be a great defect somewhere in the gas manufacture. Instead of distillation of coal in closed retorts furnishing the gas, there must have been a burning up or destruction of the coal, the nitrogen being due to decomposition of admitted air.

Witthaus gives a slightly different proportion of carbon monoxid, saying: "It is a constituent of coal gas in from 4 to 7.5 per cent., and of water gas from 30 to 35 per cent."

As to the relative composition of coal gas and water gas, there seems, however, to be a few well-established facts that might be noted here, the most important being that in water gas there is four times as much and sometimes five or six times as much carbon monoxid as in coal gas.

The amount of marsh gas or methane in water gas is usually one-half as much as in coal gas, and sometimes less than this. The illuminating hydrocarbons are usually greater in amount than in coal gas, sometimes twice as great or even more, depending entirely upon the amount and quantity of oils used in the carburetter. The quantity of hydrogen is less in water gas than in coal gas. There is likely to be a trace of sulphur, more so in coal gas than in water gas.

It must not be forgotten that throughout this paper the water gas spoken of is the carburetted water gas used for illuminating purposes, a mixed gas that has a marked benzine tar-like odor, and not the odorless fuel gas or plain water gas.

With the purpose of learning something of the effects on the human system of water gas, I addressed letters to a number of chemists, plumbers, gas officials, and employees of various gas works, and received a variety of answers which are more or less contradictory. I then began to look up the subject of water gas in encyclopedias, text-books of chemistry, and in the numerous pamphlets written on the subject, and found that the encyclopedias and text-books give but little information along the lines desired, and that the pamphlets were mainly the results of private financial interests, clashing either with public interests or other private money making corporations, and had to be scanned carefully to get a germ of truth.

I think, however, enough will develop to prove a few propositions that I shall enumerate at once:

1. Both coal gas and water gas are dangerous to health and life.

2. There can be no question that the greater proportion of carbon monoxid in water gas renders it by far the more poisonous of the two.

3. Both gases are explosive and may thus imperil life.

4. Coal gas containing marsh gas in greater quantity, is the more explosive.

5. Both gases, in burning vitiate the air of the living room.

6. The gases are much alike in this respect, water gas burning up less of the oxygen of the room, but producing more carbonic acid gas.

Coal gas and water gas are dangerous to health and to life. In sufficient quantity, either of these gases could cause death by exclusion of oxygen; to breathe either gas pure would cause almost instant death, as neither contains oxygen in appreciable amount, and life would cease from its need. If breathed in a diluted form, the heavy hydrocarbons and marsh gas would act perhaps first as cerebral stimulants, followed by a mild anesthetic effect, but would be non-toxic, as long before the amount of them would be sufficient, that other constituent, carbon monoxid, would have caused death. The carbon dioxid acts only mechanically, by preventing the ingress of just as much oxygen carrying air as it displaces; in fact, the other constituents, except the monoxid, will act in the same way, their volume but diluting the air to the extent of their presence.

Despite the foregoing facts, there have been several statements as to the poisonous nature of marsh gas. Now, it is a well-known fact that coal miners work for hours in an atmosphere mixed often with large quantities of this gas and do not suffer ill-effects. The argument of Leblance, that "the Davy lamp was invented for the protection of persons (from fire and explosion), living, breathing, and

working in such an atmosphere," must indicate the falsity of such a statement.

Now, coming to the relative effects of the two, it looks as if the difference must depend upon the amount of carbonic oxid contained in each. We shall find our evidence very contradictory. Chemists agree that carbonic oxid is poisonous.

Witthaus says of it: "The actively poisonous character of this gas . . . renders it practically the most dangerous of toxic gases. The number of accidental and suicidal deaths from carbon monoxid now exceeds that of similar poisonings by any other agent. Carbonic monoxid combines chemically with the oxyhemoglobin of the blood to form a compound more stable than oxyhemoglobin, and hence by preventing the absorption of oxygen in the lungs, it produces what may be termed an internal or circulatory asphyxia, and the respiratory function of the hemoglobin so combined is permanently destroyed." Yet, added to a petition sent to the Legislature of Massachusetts in 1888, asking that the law passed there in 1880, at the suggestion of the Gas Inspector, that no gas containing more than 10 per cent. of carbon monoxid should be manufactured in Massachusetts, be repealed, was the following statement, signed by Prof. C. F. Chandler, President of the Health Department of New York, and Professor P. W. Bedford of the College of Pharmacy of New York: "It (water gas) is no more dangerous to life and health than coal gas, and there is no just ground, as far as health and life are concerned, to prohibit its manufacture."

Prof. E. Story Hunt of Montreal, in 1884, before the joint standing Committee on Manufactures in Massachusetts, said that, "it is not proved that carbonic oxid is a more noxious or deleterious ingredient in gas than the various hydrocarbons, and I do not think it has been shown that gas containing twice or three times as much carbonic oxid as ordinary coal gas is really any more dangerous than the ordinary illuminating gas."

In 1878, the Consumer's Gas Company, of Toronto, obtained from Dr. W. H. Pike, Professor of Chemistry in the University College, Toronto, the following statement: "The city gas (water gas) as at present supplied, is, if used with the ordinary precautions, free from all practical danger. As to the comparative danger to life if there be an open tap or leak in a bedroom in the case of coal gas or Lowe gas (water gas), I think there can be no great difference."

Prof. Henry Wurtz, Gas Chemist of New York, in 1883, gave sworn testimony to the effect that an illuminating gas containing a predominance of carbonic oxid was almost in every respect safer for public use than one in which marsh gas predominates, and in no respect less safe."

Dr. E. G. Love, Official Gas Examiner of New York, testified in 1883: "I do not consider the presence of carbonic oxid in illuminating gas as objectionable."

Prof. Ira Remsen, of Johns Hopkins University, testified: "I do not consider the use of water gas at all dangerous if used with the same precautions as are observed in the use of ordinary coal gas."

Prof. H. H. Croft, of Toronto, testified: "There can be no great difference between coal gas and water gas as to danger."

Dr. Joseph Jones, Health Officer of New Orleans, in a report to the Mayor in 1880, states that "Water gas is not more dangerous in case of leakage than coal gas."

Prof. F. B. Wilson, Chemist of Baltimore, testified, "That the Lowe water gas is less dangerous in case of leakage than gas made from coal."

In 1872, Dr. James Louttit made a report to the British Association of Coal Gas Managers, of experiments on rabbits conducted with coal-gas and water-gas and concluded that "carbonic-oxid gas in the presence of hydrogen, is, at least, not more poisonous than the carburetted hydrogen gas."

Prof. Alex. Crum Brown, of Edinburgh University, wrote in 1896: "The poisonous action of illuminating gas depends almost entirely on the carbonic oxid which it contains. In the case of leakages into rooms where persons are already asleep, or where people are unaccustomed to the use of gas for lighting purposes, the danger is certainly greater with carbonized water gas than with common coal gas."

Mr. Robert M. Morse, Jr., in his closing argument before the Massachusetts Committee on Manufactures, in endeavoring to pass a bill repealing the 10 per cent. carbonic oxid bill passed in 1880, stated, "That both water gas and coal gas contain elements dangerous to the public health,

if they are breathed. The proportions of these elements differ. That coal gas is somewhat less dangerous than water gas if inhaled, I have no question. It will take a little longer for one to be poisoned by coal gas than by water gas."

Of the various Philadelphia chemists from whom I have obtained replies, all agree that water gas is the more dangerous to life and health. I hope, however, they themselves will give you their testimony.

From the plumbers from whom I have received replies, all but one are convinced from their business experience, that their workmen are more easily affected by the present mixed gas than our former coal gas.

Last year Philadelphia manufactured in all 4,913,461,000 cubic feet of gas, of which 1,916,396,000 was water gas, supplied by the United Gas Improvement Company, the city gas employes mixing as well as possible the two portions—a little over a third water gas.

In March, 1888, several hundred physicians of Massachusetts, including a great many medical teachers and examiners such as Wood, Bigelow, Minot, Bowditch, Williams, Hodges, Shattuck, protested against the passage of any law allowing the manufacture of illuminating gas containing more than 10 per cent., of carbonic oxid, as the intensely poisonous properties of that gas are well known, and are dangerous to health and life."

Prof. William T. Sedgwick and William Ripley Nichols, of the Boston Institute of Technology, made in 1885 a report on the subject of water gas to the State Board of Health, Lunacy and Charity. This report was the result of a series of careful experiments made on lower animals with coal gas and water gas. I will quote liberally from this report: "It is generally admitted that while the other ingredients of illuminating gas are not without their physiologic effects, when breathed with air in a mixture of which they form a large proportion, nevertheless the only ingredient possessed of really toxic properties is carbonic oxid."

They further say:—"The conclusions to which our experience has led us are as follows:

"1st. Water gas is more poisonous than coal gas.

"2d. The experiments confirm the work of others in proving that carbonic oxid is not a cumulative poison; that is to say the breathing of certain small quantities for a long time is not equivalent in effect to the breathing of a large quantity for a short time, and this fact has much to do with the difference between the two gases. For an atmosphere containing a small percentage of coal gas may be breathed for many hours without serious effects, while an atmosphere containing the same amount of water gas will be injurious and even fatal.

"In order to produce distinctly poisonous effects by means of either coal gas or water gas, it is necessary that the carbonic oxid in the mixture of gas and air shall reach a certain amount; and to accomplish this with coal gas in an ordinary room is a matter of some difficulty, as we have found, before the natural ventilation which is all the time going on through the walls, ceilings, and floors, and through the cracks about the windows and doors, permits of so much diffusion, that this, combined with the moderate amount of carbonic oxid present in the inflowing gas, does not allow the danger line to be easily reached. If it were not for this fact, accidents from the use of ordinary coal gas would be much more frequent than they actually are. With water gas, on the other hand, it is not at all difficult to reach the danger line; *i. e.*, to obtain, in an ordinary apartment, a dangerous percentage of carbonic oxid. This is not, as some suppose, on account of the somewhat higher specific gravity of water gas as a whole, for this fact would influence but slightly the diffusion of the dangerous ingredient—carbonic oxid; but rather on account of a larger proportion of the poisonous ingredient which water gas contains.

"Water gas is therefore not only in itself more poisonous than coal gas, but is also far more likely to produce injurious effects from similar accidental causes.

"It must not, however, be inferred that gas containing twice as much carbonic oxid as another is necessarily only twice as dangerous. On the contrary, the danger increases, particularly with certain percentages, very much more rapidly than this.

"Dogs, cats, rabbits, and pigeons do not show any symptoms of poisoning after ex-

posure for many hours to an atmosphere of one per cent. of ordinary coal gas, being apparently able to resist it almost indefinitely; and in one case animals were exposed for twenty-four hours to an atmosphere containing, the greater part of the time, as much as two per cent. of this gas, without showing symptoms of anything worse than discomfort and drowsiness.

"On the other hand, dogs, cats, rabbits, and pigeons when exposed to an atmosphere containing from one-half to one per cent. of water gas (with which we have experimented in Middletown, Conn., and Athol, Mass.), have invariably, by the end of an hour and a half, shown serious symptoms of poisoning—such as anxiety, salivation, vomiting, delirium, loss of muscular control, etc.; and death has generally resulted after five to eight hours' exposure to an atmosphere containing not over one per cent.

"If, instead of comparing the effects of the same percentage of the two gases, we consider the time necessary to cause poisoning by the use of the same quantities of gas under the same conditions, we find a contrast not less striking.

"Incidentally we have been enabled to note the primary effects upon man himself, for, while we have frequently entered rooms charged with coal gas, and, in some cases, have remained comparatively long, the effects have never been more than disagreeable. Oppression and headache have not seldom resulted from entering, in the same way, rooms charged with water gas; and in one case exposure for a total of one hundred and ten seconds to an atmosphere containing two and a half per cent. of water gas produced anxiety, trembling, partial loss of muscular control, slight nausea, and an after-headache of the severest character, lasting for several hours."

In one of these experiments of exposure to a given quantity of water gas, seven animals died within eight hours, whereas eight animals exposed to coal gas, under precisely similar conditions, were all living after eight hours' exposure, and in twenty-four hours' time two only were dead, six still living.

To learn something of the poisonous nature of carbonic oxid, one need but study the returns of the Paris suicides, by the burning of charcoal in closed rooms. Their object in closing cracks, doors, etc., is threefold: to avoid interference with their purpose, to produce carbonic oxid by reason of the deficient supply of oxygen furnished to the fire, and to prevent the escape of this poisonous gas, and make death the more quick and sure.

The following figures of the relative number of deaths from inhalation of coal gas and water gas have been in part compiled by Dr. Raymond of Brooklyn, and in part by Mr. Charles P. Greenough of Boston.

Deaths from illuminating gas in New York City and Boston:

	Water-gas	Coal-gas
1880	14	1
1881	18	3
1882	22	2
1883	24	0
1884	19	2
1885	18	0
1886	35	1
1887	27	0
1888, Jan. and Feb.	7	0
Total	184	9

During the same period in Boston there were but three deaths, coal gas only being used there.

Deaths from water gas in Baltimore:

1883	'84	8	'86	'87	Total
6	3	14	13	9	45

During this term of years the total output of coal gas in Boston exceeded the total output of all gas in Baltimore, and yet there were but two deaths in Boston, a city where the houses are more tightly closed up than in Baltimore, on account of the greater severity of the weather. The total number of deaths from coal gas in Boston is fifty-five since 1823 (to 1888).

Workmen who have been employed by water gas companies, do not suffer as quickly or as seriously as a tyro, but they seem to realize acutely the added danger to which they are exposed when hunting for or repairing a leak. They take every precaution and take a man away as soon as he feels the slightest effects. Dr. Edwin A. Down, of Middletown, Conn., relates an interview that he had with a workman, evidently a foreman, who says:

"On several occasions our men have had to be carried out of the ditch. During

the illness of some of the workmen, I was compelled to get into the ditch myself, and after making the opening in the main, I began to feel the effects of the water gas at once. At first I felt a fullness in the head. Soon I became dizzy and everything about me seemed to be moving. I attempted to call to my helpers, but found it impossible to do so. I recognized my men and knew where I was, but it was not until after I had been conducted out of the ditch, and had been supplied with stimulants, that the power of articulation was restored." This man said that he was not aware of the poisonous nature of the gas until his attention had been directed to it, but he admitted that accidents to his men were more frequent, and the symptoms were more poisonous than those due to coal gas.

The rapid effect of water gas on workmen employed in repairing leaks was noticeable in Philadelphia as early as 1876, when the first water gas plant was established in that city (at Manayunk). The workmen would seem to suddenly go crazy and become maniacal and have to be dragged to the surface, and given fresh air at once. It was, I presume, of this Manayunk plant that the Hon. Rob't. M. Morse, Jr., counsel of the water gas companies, seeking entrance into Boston, spoke as follows:

"There is not an instance in which the Lowe process once adopted has been abandoned, except in Philadelphia, where the works are owned by the city, and the business is managed by the politicians, and the results of the adoption of the Lowe process was such a reduction in the amount of labor employed, one hundred men being sufficient, under the new system, to do what required two thousand or so under the old method, that the politicians could not stand the pressure from those who lost or where liable to lose their places, and so went back to the old way."

Despite this convincing evidence and the absolute proof of the fact itself, of a poison increasing in its severeity of action and rapidity as the dose is increased, provided, of course, the dose be less than lethal, there are some well-informed officials connected with our gas companies, who do not seem to admit its truth.

Mr. Samuel T. Bodine, General Manager of the United Gas Improvement Company, has been interviewed within the past two weeks, and says that "water gas is not any more poisonous to life and health than coal gas," and also that "it has not caused any more deaths (for equal quantities of gas consumed)."

Mr. William K. Park, Chief of the Bureau of Gas of Philadelphia, endorsed Mr. Bodine's words and added that in case of death from these gases, the period required to produce the result would not vary as much as aquarter of a minute. This statement is made in spite of al testimony and all common-sense reasoning to the contrary, for if true, it would indicate that oxygen is not a necessity in the aeration of the blood, that life could exist without oxygen.

Does it seem plausible that the atmosphere of a room is vitiated to the same extent by an equal volume of coal gas as of water gas, one containing four times as much carbon monoxid as the other? Does it seem possible that the effects are equal in rapidity of action and in severity? If so let us carry our lines of reasoning a little farther. Suppose we should discharge into the room, not six feet of gas containing two cubic feet of carbonic oxid, but a like quantity of pure carbonic oxid, by the same reasoning our results must be the same, if the two feet of the oxid in water gas has no more effect than the one-half foot in coal gas, the six cubic feet cannot have any more effect. The proposition is so absurd that it really needs no consideration, and yet it has been so befogged by paid and interested testimony, that it has seemed to demand more consideration than any other branch of the subject.

Both gases are explosive and may thus imperil life, mainly by reason of the marsh gas, which is present in quite considerable quantities in both gases, but in much greater quantity in coal gas than in water gas, and the explosiveness of the two gases is approximately proportioned to the amount of methane contained in each.

Both gases vitiate the air of the room in which they are burned. In other words they rob the air of oxygen, and fill it with products of decomposition, deleterious to health and life mainly by occupying a space that otherwise would be occupied by the oxygenated air. From the table

here appended, kindly worked out for me by Mr. Edw. H. Earnshaw, it will be observed that every hundred volumes of coal gas consumed requires 121.25 volumes of oxygen, whereas for a hundred volumes of water gas but 114.25 volumes are necessary, while the products of combustion of carbon dioxid are less, and water vapor produced is greater. Reckoning the consumption of oxygen as per candle power, assuming the one to be 16 candle power, the other 25 candle power, it will be observed that the amount of oxygen required is greater, and the amount of carbon dioxid and water produced is greater in the case of coal gas than that of water gas.

Edw. H. Earnshaw's table:

Coal-Gas		(CO_2)	(H_2O)	(O.)
Benzine-vapor...	0.4	2.4	1.2	3.0
Hydrocarbons...	5.0	12.5	12.5	18.75
CO	8.	8.		4.
H.....	47.		70.5	23.5
CH_4.....	36.	36.	72.	72.
CO_2.....	2.	2.		
N.....	1.6			
Total Volume	100.0	6 .9	156.20	121.25
Per c. p. illuminating power 16 c. p.....		4.	10.	7.5
Water-Gas				
Benzine-vapor...	0.5	3.0	1.5	3.75
Hydrocarbons...	12.0	30.	30.	45.
CO.....	31.	31.		15.50
H.....	34.		57.	17.
CH_4.....	17.	17.	34.	34.
CO_2.....	3.	3.		
N	2.5			
Total Volume	100.0	74.	122.5	114.25
Per c. p. illuminating power=25 c. p.....		3.	5.	5.

For the same illumination the products of combustion from 16 c. p. coal-gas as compared with 25 c. p. water-gas would be

CO2.....	⅓ more
H_2O.....	double
O	½ more

These conclusions seem to accord with those of several other chemists. In connection with this Dr. Benj. Silliman, Professor of Chemistry at Yale College, wrote in 1869: "In entire variance with popular belief our analyses prove that a compound hydrocarbon gas (water gas) consumes much less atmospheric oxygen, and vitiates a given volume of air to a much less degree than an ordinary gas of equal illuminating power."

Having, I hope so presented the subject that it is evident that water gas in its effects on the system is much more dangerous than coal gas, it is now necessary to study how its dangers are avoidable. Cases of suicide and of gross ignorance it is almost impossible to avoid, but here are numerous cases of accidental deaths. According to Witthaus "nearly one-half of the accidental poisonings in New York City in 1889—1892 were by illuminating gas and the same agent was used by suicides more frequently than any other poison, except Paris green and rat poison."

Accidental deaths occur mainly because of breaks in the pipes or mains or leakages about the fixtures. In Philadelphia this last year there were three deaths in one family occasioned by a leak in a pipe in a house on Darien street, and in last Sunday's papers there was a note of five deaths occurring from gas escaping into a house in Lansford, Pa.

More attention will have to be paid to the street mains, to the gas pipes within doors, and also to the fixtures, if this gas is introduced in Philadelphia, and there is every reason to believe it will be, if not by a private corporation, then by the city, its economy of manufacture almost necessitating such a change. You will remember doubtless, that the water gas company is well satisfied at present to sell the city its water gas at 37 cents a thousand cubic feet, and I am informed that they are able to manufacture it at a rate little if at all beyond 18 cents per thousand cubic feet. The economy of manufacture is, I believe, due to the small amount of labor required; as before said the labor of 2,000 men is displaced by that of about 100. In this connection, a fact that has come to my notice within a few days may be interesting. In Cincinnati the Private Coal Gas Company received sufficient money from its residual and bye-products, coke, etc., so that its coal gas, which it sells to the community, is practically profit.

If the city is going to use water gas as its illuminant, it will be necessary to at once tear up its mains and lay them anew on a more comprehensive plan. They are nearly all too small and inefficient on account, not only of their patchwork construction but also on account of their age, with its attendant rusting and clogging from deposits. The faulty construction

of our distribution, with the rusting within the main, and the clogging from the condensation of the hyrdocarbons, naphthaline, etc., requires that the pressure to force the gas out through the mains be much increased, and instead of using from ¾ in. to 1½in. pressure, I understand the pressure is frequently as high as 5 inches. This great pressure causes increased friction with the deposition of more of the hydrocarbons. In addition it causes a great escape of gas at points of leakage and forces within the house pipes, and at gas fixtures the gas through openings that otherwise would not allow of the escape of the gas. At times of the day when gas is being little used this pressure is often greater and gas will escape at such times into a house and not a other times when more is in use. This would indicate that the gas should be turned off at the lower end of the service pipe, or at the meter when not in use. The dangers and discomforts of our method of distribution will be much increased by the introduction of water gas, as in order to distribute it with the present mains the same pressure must be used as at present and the illuminating virtues of the water gas will be decreased in the same proportion as our coal gas is now reduced (from 16 c. p. to about 12 c. p.); and in consequence instead of a light of 25 c. p., as should be obtained, we wil practically get but from 16 to 20 c. p. Danger to life and health will be much increased by the extra quantity of carbon monoxid that will escape into the house from any leaks or openings that may exist, this danger will be increased as we have seen at least four or five fold.

In the Mayor's report for 1896, attention is called to 3-in. main which was extended, and from the point of extension, became a 6-in. main, and later an 8-in. main was added to this. The method of distribution, as well as the choking up of the pipes by rust, naphthalin, etc., and perhaps numerous leaks and ever-open pipes are in the main responsible for the loss to the city, last year of about 23 per cent. (1,132,646,138 cubic feet) of the total production (4,913,431,000 cubic feet) of gas, whereas the public companies of England average 9 per cent. loss, and the private corporations about 9.1 per cent. loss.

It must be evident that outside of the money loss to the city, this enormous amount of gas lost must prove a detriment to health in the localities where its escape occurs. No doubt we all know of several parts of our city which have the gas odor, such as has been observable on the Walnut street front of Dr. Willard's house for over six months past.

In connection with this matter I wish to read a letter from one of Philadelphia's most experienced plumbers which he has written intending to send to Mayor Warwick:

"As a citizen, some while ago I felt much pleased, when the municipality reduced the price of gas from $1.50 to $1.00 per 1000 feet, as it was a step in the right direction, provided the quality of gas was maintained.

"Now, I have had over forty-two years' experience as a plumber, and it is from that, as well as facts which have lately been forced upon my attention, that I feel it my duty to write you.

"Within six months after the dollar gas was inaugurated, I began to hear complaints from my customers and friends about the poor quality of the gas, but as you know, complaints of this kind are not unusual, I cannot say that I was much impressed by them at the time. But the complaints of want of light or illuminating power of the gas, seemed to be continually on the increase, so that in many cases I have made personal examination of the pipes to find the cause. In many cases I have found that the pipes are almost entirely clogged up with rust or fine deposit from the gas. The remedy is, of course, to blow them out, which permits the gas to flow freely through them until the rust or deposit again accumulates, which does not take more than three months. This, of course, is not pleasant for tenants and owners to have done continually, aside from the question of expense, but when I say to you, that I now have three men, and at times as many as six, who do very little else but blow out pipes, and that every plumber, who is in active business, whom I have spoken to upon the subject, is now undergoing an experience similar to mine, you can begin to appreciate its magnitude. The necessity for blowing out gas pipes has always existed, and probably always will, but for one pipe that needed blowing out six

years ago, there exist now fifty, where light can hardly be obtained without it. The cause, I think, must be in the quality of the gas itself, or its manufacture. There is also another aspect of the question which to my mind is serious, and that is, many of the distributing pipes throughout dwelling houses seem to be so corroded and affected, that they are unsafe. I lately investigated a large house on West Walnut street, and the pipes were so affected that I abandoned them and substituted new ones. I assume that you will agree with me that a gas pipe in that condition is very dangerous. I have kept a sample of this pipe, and should be glad to submit it to you for examination, should you desire to see it. If this were an isolated case, I should not regard it so important, but I regret to state that it is only one of a number. It seems to me that this subject is a matter that should be thoroughly investigated by competent men, and a remedy found. I trust you will not view me as an alarmist, nor as one interested in any way in gas or its manufacture, because I am not; but it seems to me possible, although I, of course do not assert it as a fact, that the origin of some of our late fires, about which there is so much obscurity, might be the result of a corroded gas pipe worn through, such as I found on property No. 1219 Arch street. There is also another phase of the question, about which I hardly care to hazard an opinion, and which may also be a factor in the corroding of pipes, and that is electricity. We now use it for telegraph, telephone, lighting, and most important of all the trolley, which uses it in great quantities. Some of it must escape, and it would naturally go into the ground. There must be some waste electricity in our public streets, with so much of it about. Who can say what effect it has upon our water-pipes and gas pipes? I cannot, because I do not know positively. But I believe there is an element of danger unless gas-pipes are examined from time to time and kept in good condition. I might add in conclusion, that the house that I have spoken of as an illustration was originally first class, and I have no doubt that when the pipe was put in expense was not considered. If that first-class pipe could not withstand the action of the present gas, how much less so would pipes in many of our new and smaller dwellings, where the very cheapest plumbing exists. I can show you pieces of pipes obtained from both houses mentioned in the letter, and think them most interesting specimens as showing the process going on in our own houses, perhaps even now as bad or worse."

* * * * * *

One point that I have neglected has been the physical effects of the poor illuminating power of the gas. Here in Philadelphia we suffer from diminution in its lighting qualities. The friction due to the great pressure required and the passing through long, inefficient and closed-up mains and pipes cause a condensation of the heavy hydrocarbons, the illuminants, and thus our gas is robbed of its light-giving qualities. If we were to introduce water gas in place of coal gas, there would be no difficulty in raising the candle power from 16 to 25 or even 28 c. p., provided our pipes were in good condition. This low candle power of our gas must necessarily exert a decided influence upon the health and comfortable use of the eyes of our inhabitants, and must needs increase the labors and profits as well of the oculist and optician, not to speak of the family physician and neurologist, who are often called to diagnosticate the nature of obscure head symptoms so occasioned.

Our Mayor's remarks in his annual report for 1896 on the subject of Philadelphia's gas will bear repetition here, as, should his suggestions be followed, we will obtain a better and safer illuminant at less cost, and will still own and manage our own gas plant, and will feel that if a reduction from $2.30 per thousand cubic feet in 1875 to $1.00 in 1893 was possible under the old order, an even greater proportionate reduction will be made in the future.

I will quote from this report:

"The gas manufactured by the Philadelphia Gas Works is equal in quality with that made in any city of the Union. In other words, the gas in the holder before distribution is a good illuminant of the necessary candle power, but unfortunately, by means of our method of distribution, when it reaches the consumer it has lost much of its illuminating quality. This is not due to any fault of the gas itself,

but the inefficient and insufficient methods of distribution. The gas has to be forced by great pressure through many miles of small-sized or inadequate mains, and by reason of this great pressure the candle power is necessarily reduced because of the excessive friction to which the gas is subjected; it is thereby robbed of the hydrocarbon, which is its light-giving quality. The matter of distribution should be taken up and considered with the greatest of care, and perhaps it would be advisable under all the circumstances to have an estimate made of the cost that would be involved in effecting the desired changes. Plans should be drawn showing the location, the capacity and the life of the mains, in order that this work may be done systematically and economically. For instance, in one section of the city leading from the gas works to supply a certain locality, years ago, a three-inch main was laid, which was in that day considered of sufficient size and capacity, but as population increased and passed beyond the limit of the original calculation it was necessary to further extend the main and a six-inch main was added, and subsequently to supply the still growing demand, an eight-inch main was laid; thus we have three different-sized mains joining each other and used for the purpose of distributing the gas, when in truth and in fact a 20-inch main for the proper distribution of gas in that locality is absolutely required. The fault does not lie in the manufacture of our gas, which is produced from the best coal that can be purchased for the purpose and the application of scientific methods, but in the inadequate and insufficient means of distribution, and until better methods be adopted there can be little if any improvement.

"The gas works are a most valuable asset and should never pass from the absolute control of the city. The plant is valued at about $30,000,000—close to the actual debt of the city at this time, and money will be well expended if the changes suggested are carried out."

From the facts that have called forth the foregoing remarks, I have reached these conclusions:

That both water gas and coal gas are dangerous to life and health. Water gas, however, being by far the more poisonous when inhaled, greater care must be exercised in its use; consequently should water gas be adopted as an illuminant in our city an entire readjustment of the method of gas distribution would be necessitated, and also a thorough inspection and reparation of the pipes and fixtures in all individual houses.

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CURRENT LITERATURE CONDENSED.

Diagnosis in Diseases of Infants and Children.[3]

In the clinical investigation of diseases in early life it is important to bear in mind two fundamental facts. First, there are comparatively few common pathological processes—for the most part confined to the gastro-enteric tract, the lungs, and the brain—but an infinite variety of types of disease; and second, functional derangements may cause marked general disturbance with alarming symptoms, which may speedily be recovered from, or on the other hand occasionally prove fatal. The acute diseases most frequent in early life are gastro-enteric and respiratory. Less frequent are otitis media and infectious diseases including the exanthemata, diphtheria, influenza and malaria. Tuberculosis and disease of the brain and kidneys are relatively infrequent.

In diagnosis there are three principal sources of information, history of the case, inspection, and physical examination.

In early life the symptoms available are almost entirely objective. The inability of children to correctly describe subjective symptoms, make it of the utmost importance to secure from the mother or nurse an accurate history. In dispensary practice it may be well to have a definite system which shall outline the patient's entire existence to date. In private practice, however, while it is necessary to know what diseases the little one has had, or what hereditary influences may be at work, the practitioner must cultivate skill in managing the family as well as the patient. Certain general questions should be asked. As stated by Starr, "They must be sufficiently exhaustive to touch upon all the functions of the body, and when a trail is started it must be patiently followed to the end. Alteration in sleep, bodily strength, surface temperature, ap-

[3] Edmund D. Chesebro, M.D., Providence, R. I., in *Atlanta Medical Weekly.*

petite, digestion, urine elimination, respiration, and so on, must be sought for; and the account of such deviations from a normal state, as vomiting, diarrhea or cough will suggest further questions as well as point out the path to be followed in the future examination."

In early life the physiognomy of disease constitutes one of the most important elements in diagnosis. Finlayson says: "In almost every serious disease of early infancy and childhood, it is possible by studying carefully the relations of the spontaneous movements to each other, and to the attitude and expression of the child, its cries, smiles, inarticulate noises, its color, state of general nutrition, behavior in sleep and in waking, to arrive at a reasonable and often perfectly just conclusion as to the general nature and locality of the disease."

Comparatively little information can be obtained from looking at a child's face and a bundle of clothes. An examination of the naked body must be made.

Inspection should be methodical. Posture, character of respiration, appearance of abdomen and particularly the face and the shape of the head demand attention. Suffering is easily detected. The features become pinched and drawn in exhaustive disease. Mouth breathing and nasal discharge are significant. The shape and size of the head, the fontanelles, bridge of nose, pupils, ears, lymph glands of neck, presence of eruptions, herpetic vesicles, etc., must be carefully noted.

Determine whether eruption of the teeth is normal. While no child is ever seriously ill from teething, it often happens that pronounced reflex symptoms develop and continue until the irritation is removed. The child is fretful and peevish, restless at night, and has disturbance of digestive functions. There may be a little rise of temperature. Not infrequently eczema of the cheeks develops or is aggravated by this cause.

Admitting and emphasizing the fact that difficult dentition is one factor in the causation of certain symptoms, I believe the physician cannot be too careful or thorough in examination before making a diagnosis of teething.

Reflex symptoms from other causes must be recognized. Phymosis with the accompanying irritation may produce convulsions of such severity and frequency that the attending physician gives an unfavorable prognosis as to the child's future mental condition. Immediate cessation of the nervous phenomena follows removal of the cause.

Much can be learned from the infant's cry. The cries from actual pain, discomfort, hunger, temper, and habit, are frequently so characteristic as to point directly to the cause of the suffering.

Personal inspection of the napkins with reference to the evacuations is frequently of importance.

With a full history and a thorough inspection of the patient, the experienced physician can often make almost a positive diagnosis. Physical examination, however, should rarely be omitted.

The methods are identical but skill and tact, and frequently an order of examination different from that followed in the adult, are demanded. Gradual approach, gentleness, efforts to divert attention from the real purpose, and postponing to the last inspection of the throat any anything which may cause pain, will generally enable a satisfactory examination. Attention must be given to pulse, respiration, temperature, general development, condition of the skin, the thoracic and abdominal organs, and the throat. The urine may demand attention.

In health, the child pulse differs from the adult, being much more frequent, more irregular and more easily influenced by slight causes. Alterations in frequency and rhythm with no other abnormal symptoms are of little significance. Early life respiration is abdominal, irrespective of sex. In healthy infants it is irregular and uneven, accelerated by muscular or mental excitement, by fever, by interference with blood æration, and by thoracic and abdominal pain; diminished most frequently by brain affections. Changes in rhythm give the so-called "Cheyne-Stokes respiration," and "expiratory respiration." "Inspiratory dyspnea" or "Expiratory dyspnea," is significant.

In young children temperature is best taken in the rectum. In older children the axilla, groin, or mouth may be employed. Causes comparatively slight produce pronounced elevation of temperature. In general from a given cause temperature is usually higher in the young

than in adults. Starvation temperature in infants must be recognized. Subnormal temperature occure in wasting disease.

Development and nutrition should be noted. The condition of the skin, whether velvety smooth and soft, characteristic of health, or dry, harsh and wrinkled.

In examination of the lungs the back gives more information. The apex beat of the heart is higher and further to the left than in the adult. It may be displaced by deformity or by fluid in the pleural cavity. The area of heart dulness is relatively large. Under two years of age, loud murmurs almost invariably are congenital.

Particular attention must be given to the presence or absence of tympanitis or abdominal tenderness. The condition of the liver and spleen should be ascertained. Normally the lower edge of the liver is somewhat below the free border of the ribs. The spleen, if sufficiently enlarged to be of diagnostic importance, can generally be felt below the ribs. In deformed chests both the liver and spleen may be displaced downward.

A careful inspection of the throat should be made in almost every case of acute illness. The tongue and the mucous membrane of the mouth, palate and fauces should be examined. Bacteriological examination may be indicated. The eruption of measles and scarlet fever appear first on the hard palate.

With some experience, tact, patience and thoroughness in obtaining a history, inspection and physical exploration, diagnosis in the young can be made with fully as much accuracy as in the adult. Error is so common because of superficial examination.

Aphorisms.[2]

1. Life is short, the curriculum long; examiners treacherous, tips fallacious; fees exorbitant, diplomas valueless.

2. Of making many treatises there is no end, and a superfluity of lectures causeth ischial bursitis.

3. Whoso seeketh appointments seeketh grief and heartburning, for the thrysis-bearers* are many, but the inspired few.

4. The art consists in three things—the disease, the patient, and the house-physician.

5. He that would acquire a competent knowledge of medicine ought to be possessed of the following advantages:—Natural ability; competent instructors; favorable conditions for study; early tuition; indomitable perseverance; ample capital.

6. General practice is harassing; specialism lucrative; midwifery laborious; life assurance responsible; hospital measures radical.

7. Dentistry is golden; ophthalmology cleanly; throat-work sanguinary; otology circumscribed; pessary practice debasing; hygiene elevating; clubs demoralising.

8. Whoever would prosper in private practice must first master all these; must possess presence of mind, gentlemanly manners, true sympathy, an iron constitution, an even temper, a head for figures, knowledge of human nature, a devoted wife.

9. The successful practitioner understands three things—the digestion of infants, the nervous organization of women, the infirmities of age.

10. The physician is a frequent worshipper in the temple of the dead, but the surgeon's memory for mortal cases is ephemeral.

11. The physician recognizes the limits of his art, but the surgeon discredits himself by attempting the impossible.

12. A scientific operation requires three conditions—accurate diagnosis, carefully-planned details, patient nursing.

13. The most acute cases are those which are suitable for the surgical wards; the next most acute are suitable for the septic wards; after these comes cases suitable for clinical; then those suitable for the medical wards; cases more chronic than these are cases suitable for another hospital; and if there be any others yet more chronic than these, they are eminently fitted for a parish infirmary.—*Guy's Hospital Gazette.*

* A term applied to the general body of worshippers in a Greek [Bacchic] temple.

The *Canadian Journal of Medicine* has discovered that a reasonable explanation of the hard times theory of exemption from sickness is that a long, strong dose of misfortune is either a powerful tonic to the brain or a depressing influence which leads to despair and suicide.

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PHILADELPHIA, SATURDAY, NOVEMBER 27, 1897.

EDITORIAL.

"EYE-SIGHT SPECIALIST."

THE REPORTER is in receipt of a test card, a present from an optician who announces himself as an "eye-sight specialist." It trusts it may be acquitted of ungraciousness because expressing itself in other than words of thanks.

The circular attachment to the gift discloses—"Under no circumstances do we prescribe other treatment than merely correcting all errors of refraction and muscles by glasses, when necessary to do so. Your patient is thus left entirely in your hands for whatever further treatment you may deem necessary, which is not the case ofttimes when your patient is sent to an oculist who continues to treat for other than eye defects after he has prescribed glasses."

The promulgator of this circular is by no means a charlatan. He makes no pretention to medical skill, claims no diploma, affects no title, not even Mr. He seeks our support in the same frank, business-like way that a druggist or an instrument maker would pursue. Since he makes no attempt to claim for himself the prestige and privileges of medical fraternity, he can be bound by no code of professional ethics. He is held only to the demands for honesty as a business man and an artisan.

The problem presented in this instance is not how to control irregular practitioners of medicine. It is, shall optical treatment of the eye remain with medical men or be relinquished to those without medical training; shall the physicians admit the propriety of open competition between intra- and extra-professional skilled workers.

The last alternative is highly undesirable because such competition can never be upon a fair basis. The intra-professional man is restricted by considerations of ethical principle unknown to his extra-professional rival, while he is expected to

bring more general medical skill to his task than is the latter. The family physician must choose between a fellow member of the medical profession and an outsider. He must do this impartially, without regard to the fact alluded to in the circular that the former may look at the case in too broad a manner, and also without regard to a favoritism that is simply a form of trades-unionism. One has only to consider such matters as medical electricity, hydrotherapy, etc., to acknowledge it practically impossible to allow the condition and expect satisfactory relations to obtain between family physician, patient, medical specialist and trade-specialist. Human nature is disqualified for the task by structural defects.

The issue must be faced squarely. Shall refraction and muscular correction by means of glasses be relegated to the extra-professional specialist, or to the physician who makes a special study of eye-diseases? In settling this question the claims of both oculist and optician must be put aside and only the welfare of the patient and of the general medical profession be considered. Which can do the needed work more economically, more perfectly and with less friction so far as the general profession is concerned? If we restrict the word economy to its financial significance, it is evident that the non-medical optician, advertising to a wide patronage and unhampered by any of the niceties of ethics, is in a position to do cheaper work. But for the perfection of the service rendered, the answer is just as positively in favor of the professional practitioner. The business man who advertises to relieve refractive errors and similar ocular defects by purely optical devices can no more do the patient full justice than can the dentist who is merely a mechanic, or than the manufacturer of club-foot shoes who knows nothing of the ultimate causes of talipes.

Is is true that the oculist occasions friction with the general practitioner of medicine, and that recognition of the optician will diminish friction? At first thought, it would seem that the optician, since he comes in contact with the patient solely as merchant and mechanic would not encroach on the field of the general practitioner, while the oculist might. But the oculist must exist for the treatment of such diseases as are more than optical deformities, and if one is to place any emphasis on his possible competition with the general practitioner—as suggested by the circular we have quoted—the more restricted his legitimate domain, the more will he be forced to trespass on the general practitioner. Moreover, the non-professional optician is not in sympathy with the medical profession nor a representative of it, while the oculist is, first a physician and then a specialist.

For one circular that the optician sends to a general practitioner begging for preference in cases that heretofore have gone to the oculist, he, doubtless, has scattered hundreds on door steps. The most rabid anti-specialist must admit that a specialist frequently encounters cases which he does not try to treat but refers to some other physician. Suppose the business optician meets a case demanding medical attention, where will he send it, to a physician, or to one dispensing medicines on business principles? Finally, the medical specialist is, after all, affiliated by every tie with the general medical profession and the interests of specialist and generalist are common. It is the most unworthy trade jealousy that can be successfully appealed to by circulars like the one quoted.

Dr. Mueller, of Victoria, advises bichlorid of mercury, .004, in conjunction with calomel, .125, every three hours in typhoid. He cites several cases as showing favorable results.

ABSTRACTS.

SURGERY OF THE GALL-BLADDER AND DUCTS.*

A division of the bile channels connected with the liver into the biliary tubules, the hepatic, cystic and common ducts is generally recognized by surgeons.

The first named collect the bile from the acini in the respective lobes of the liver and carry it through two channels which are included with the hepatic arteries and portal sinuses by the capsule of Glisson in the transverse fissure. These branches are united to form the hepatic duct which meets the cystic duct at an inclination varying slightly from a right angle, and they coalesce in the common bile duct, which enters by an oblique opening into the duodenum about two inches from the pyloric orifice of the stomach.

The gall-bladder, being a temporary reservoir for the bile, is a pear-shaped sac about three inches in length, which is attached to the under surface of the right lobe of the liver, with its globular fundus corresponding to the anterior margin of that organ, and its neck directed obliquely backward, terminating in the cystic duct. While this serves as a diverticulum of the hepatic secretion, a portion of this fluid is conveyed directly through the ductus communis into the duodenum. The passage of the chyme over the papilla at its outlet serves as a stimulus for the discharge of the bile accumulated in the gall-bladder, so that this becomes mingled with the alimentary mass in the duodenum. It is found that the bile collects in the gall-bladder during the intervals of digestion; and its evacuation may be due in part to the mechanical pressure of the distended stomach against the sac on the under surface of the liver. In the normal state, bile is not found in the stomach, and any regurgitation of it into that organ interferes with digestion, but when commingled with the pancreatic secretion in the duodenum a salutary influence is exerted in the assimilation of the food.

Notwithstanding the elaborate investigations upon the functions of the liver, and the rôle of the bile in the digestive processes, there is great discrepancy in the opinions of physiologists and clinical observers as to the office of this product in the intestinal canal. The experiments of Legg led him to the conclusion that "the only office which remains to it is that of emulsifying fats and of changing starch into sugar." But this inference from experimentation is neutralized to a great extent by the weight of clinical experience in regard to its important agency in intestinal digestion. The clinical phenomena of biliary derangements contribute more to a proper interpretation of the surgical pathology of the gall-bladder and ducts than inferences from physiological experiments have done, and it is incumbent upon the investigator to duly weigh not only the effects of retention and diffusion of biliary elements, but the grave consequences of the entire loss of the bile to the physical organization.

Harley claims that "the uses of the bile cannot altogether be dispensed with, for animals with a biliary fistula invariably lose flesh, become emaciated and weak. The hair falls off, the bowels become irregular, while at the same time a great and almost constant discharge of foul-smelling gases takes place from the intestinal canal. At length, after a shorter or longer period, the animal sinks and dies." Dr. James Johnson held that, "the consequences of the want of bile in the alimentary canal are truly momentous." Murchison sets forth prominently the effects of disordered secretion of the liver, and the serious results upon the general health of any interruption in the supply of bile to the intestinal tract. Bartholow insists upon the importance of bile in nutrition, and the marked influence on nutrition of

* J. McFaddEN Gaston, M.D., before the Southern Surgical and Gynecological Association, November 9, 1897.

the absence of bile from the process of digestion in the intestine. He points out the manner in which diversion of the bile interferes in the digestion of certain substances.

It is not improbable that in some cases of temporary stoppage of the duct, either from concretions or hardened mucus, there may be a dislodgment of the obstruction with an evacuation of the contents of the sac. Again, there may exist inflammation of the tissues of the duct without adhesion of its walls, and the swelling and turgescence may disappear so that the canal shall be restored to its normal state and serve to convey the bile to its proper destination in the duodenum. Should these results not come about with medical treatment, it becomes necessary to evacuate the distended gall-bladder by operation, with a view to establish an outlet, either external or by catheterization of the tract, from the sac into the duodenal canal. The subsidence of the inflammation may restore the natural discharge, and the external opening be closed, obviating a fistulous outlet. This fortunate result in securing against the waste of bile relieves this process of a most serious objection as a radical operation. It is requisite for the success of any operative procedure, that communication with the alimentry canal be established. The temporary discharge of bile by an external opening, with a view to subsequent restoration of its natural channel and ultimate closure of the fistulous outlet, is not liable to the grave consequences of a permanent waste of the biliary secretion.

When the common bile duct remains impermeable, an artificial connection of the gall-bladder with the duodenum has been proposed as feasible for returning the bile to its appropriate destination in the alimentary tube. The claim of cholecysto-duodenal communication to consideration rests chiefly upon the great importance of the bile in the digestive and assimilative processes during the passage of the food through the upper portion of the small intestine.

Entire removal of the gall-bladder in cases of atrophy or degeneration of its tissues has been resorted to without serious interference with the biliary functions, except that the bile flows directly through the common duct into the duodenum instead of having a portion reserved in store for future use. There is of course a departure from the normal state in the continuous delivery of bile into the duodenal canal, instead of physiological retention for certain periods in the sac, being poured out as requisite for intestinal digestion. Yet, it is inferred that under the change of relations in the bile-producing act, the discharge adopts itself to the natural demand for it, and experiments have proven that the ductus communis becomes endowed with a retentive power by the spontaneous contraction of its outlet for certain periods in the intervals of digestion. The continuous discharge of bile by a direct outlet from the gall-bladder into the duodenum, when the common duct is entirely occluded, certainly fulfills the ends of its production more satisfactorily than the formation of a cutaneous fistula for its escape externally, by which its influence upon the system is completely lost. At least this is the nearest approach to a normal supply of the biliary secretion which can be provided under the circumstances, and thus relieves all the embarrassments of the situation.

When the common duct becomes partially or entirely obstructed while the hepatic and cystic ducts are open, there is accumulation of bile in the gall-bladder. This may lead to a greater or less dilatation of its walls, with inspissation of the fluid contents or a deposition of concretions. Yet there is generally a marked diminution of the secretion of bile following the arrest of its discharge into the duodenum, and eventually the liver ceases to yield any secretion, so that a stasis exists in the bile-producing process. It is a well ascertained consequence of occlusion of the cystic duct for any considerable period, that various abnormal collections in its cavity ensue, such as glairy mucus, pus or sero-purulent exudations. The presence of gall-stones in the ducts, or intermixed with the accumulation in the sac, may complicate such cases, and the simple evacuation of the contents does not ordinarily afford permanent relief.

The prime question for consideration is the practicability of adopting any measure of treatment which shall restore the function of the liver and preserve the office of the gall-bladder. In case the derangement should prove to be irremedi-

able, excision of the gall-bladder is indicated. Under such conditions the attention of the surgeon may be appropriately directed to the radical operation of cholecystectomy as first practised by Von Langenbuck, and since by other European surgeons. The dissection of the adherent layers of the sac from the under surface of the liver does not seem to be called for in excision of the gall-bladder. In one of my canine experiments the outer wall of the sac underwent disintegration, while the adherent tissue was still firmly united to the under surface of the liver. Since the separation of this layer from the proper structure of the liver gives more trouble than any other step in the operation, it may be left attached after trimming off all the loose wall of the gall-bladder, and thus materially simplify the surgical procedure in cholecystectomy.

Excision or extirpation of the gall-bladder is not expected to supply the place of processes for correcting its disorders, but is a *dernier resort* in view of the inadequacy of any means for restoring the functions of this organ and for rehabilitation of the surrounding structures. When the gall-bladder and cystic duct become obnoxious to the adjacent tissues so as to cause local disorders and general derangement of health, it is legitimate to get rid of them forthwith by extirpation. They no longer serve the end for which they are provided, and constitute an abnormality in the animal economy. Removal is, therefore, rational in like manner as the separation of any other offending member from adjacent structures. This principle is generally adopted for the obliteration of cysts. And when degeneration of structure with decomposition of the contents of the sac is found in connection with occlusion of the gall-bladder, it belongs properly to the category of cysts, as it has no longer any of the capacities of a receptacle of the bile. Instead of retaining an offending member to propagate trouble to other parts, it is the dictate of common sense and sound judgment to sever its connection with the body.

This operation is not warranted in cases of temporary obstruction of the cystic duct which admits of relief by mechanical or other means, except when disorganization of the structure of the sac is imminent. In permanent obliteration of the cystic duct, though the structure of the gall-bladder be yet intact, it is reasonable to infer that degeneration will ensue, so that it becomes a legitimate proceeding to excise it.

Under cholecystotomy are included such operative measures for the relief of disorders of the gall-bladder as may be undertaken without excision of tissue, independent of puncturing or incising the sac through the walls of the abdomen for the discharge of fluid collections.

Hepatic abscess, originating in the organ or resulting from dysentery, does not fall within the scope of this paper, yet when the biliary channels become affected from obstructions, with the presence of inspissated bile or concretions in the gall-bladder, a consequential abscess may form in the liver, that calls for consideration. Ziegler states that the irritant will first affect the walls of the ducts and their surroundings and set up inflammation there. Stones formed in the gall-bladder and in the ducts themselves are frequently discharged into the intestine through the common duct. If one of them lodges or lingers in the duct retention of the bile ensues, and this may give rise to dilatation of the ducts and to infiltration of the liver with bile. The liver tissue may thereupon become degenerate or inflamed, or even ulcerated. When such an inflammation of the ducts persists for a long time, or leads to a persistent retention of the bile, the inflammatory changes extend to other parts of the liver. Brown or yellow granular biliary concretions appear in the interlobular tissue and within the lobules. The liver cells perish at various points, and inflammatory infiltrations appear within the lobules and terminate in abscess or fibroid induration. Independent of this record of the pathological changes it has been noted by other observers that closure of the natural outlet of the bile brings many troubles in its train. Most frequently the progress of dilatation in the gall-bladder, with the consequent suppuration and disorganization in the surounding structures, indicates the serious nature of the disorder in these cases. The aim of surgical interference is to arrest the march of the disorder, and to accomplish a cure.

In the absence of fistula and adhesions, when history, progress of the disease, ex-

amination of the patient, above all the presence of a tumor and exploratory puncture reveal biliary calculi, Boeckel recommends cholecystotomy, but he holds that this operation is not otherwise justifiable. On the contrary, it is clear that we arrest the inflammatory disturbance in the tissues by evacuating the distended gall-bladder. Delay in undertaking relief brings disintegration of structure, which undermines recuperative power. This tendency to disorganization may be arrested by timely resort to a judicious operative measure.

According to Musser, there are four pronounced conditions, dangerous as sequences of biliary obstruction, which may be looked upon as indications for operative interference. These are jaundice; tumor in the right hypochondrium, presumably an enlarged gall-bladder; frequently recurring paroxysmal pain; and symptoms of suppuration.

The causes in general, for stenosis of the bile-ducts are: 1, Foreign bodies within the ducts (gall-stones, parasites, etc.); 2, diseases of the walls of the ducts (*a*) congenital, (*b*) adhesive inflammation or cicatrization of ulcers, (*c*) parahepatitis); 3, tumors, etc., external to the ducts.

The enlarged gall-bladder is generally a pyriform, semi-globular or globular tumor, movable, tender, elastic and fluctuating, but may have different qualities, and the intestine is never in front of the growth.

Acupuncture and aspiration in advance of opening the abdomen, are advocated by Keen for the diagnosis of affections of the gall-bladder, but such exploratory punctures are not sustained by general experience. Other men concur in the propriety and expediency of this course, and Bartholow claims that his diagnosis can be reduced to an absolute certainty, while Harley insists strenuously upon its safety and efficiency. Satisfied that this preliminary is not requisite, and that unforeseen risks attend the modes of exploration while safer means may be relied upon for correct diagnosis, I cannot acquiesce in this measure for the detection of gall-stones in the sac or for the removal of its fluid contents, in preference to exploratory incision and examination with the finger.

While recognizing the preliminary process, exploratory operations are sanctioned by Keen, and if the ascertained conditions warrant further steps, to be followed by cholecystotomy. He inculcates as a rule, that the incision should be made over the center of the tumor and parallel to the free border of the ribs. The greater facility of access to the tumor overbalances, in his estimation, any less hemorrhage from the linea alba. It should be sufficient for exploration, about three inches in length, and enlarged, if need be, afterward. All bleeding should be arrested by hemostatic forceps or catgut ligatures before opening the peritoneum, this being done by incision upon a directory to avoid wounding the sac. Two fingers should be used, or if necessary the whole hand, to explore the condition of the abdominal organs and learn the exact nature, attachment, etc., of the tumor; and so far as possible the character of its contents. The cystic and common ducts are to be examined to determine the presence and situations of gall-stones, with their size, shape, and mobility. If any be found in the ducts, the suggestion of Handfield Jones to endeavor to push them into the duodenum should be tried. This failing, we should endeavor to push them back into the gall-bladder as this part of the duct has already been dilated by their onward passage.

It is not always practicable to find all the stones at the outset, and those not encountered at the operation have escaped subsequently or have been extracted by the operators. This shows the propriety of exploring the cavity of the gall-bladder and the cystic duct on dressing the wound, during the first week after an operation.

The first case of Parkes is very instructive touching this point, and in his graphic account of it on January 27, 1885, I was informed that an exploration of the cavity of the gall-bladder on the occasion of the operation failed to find any stones in the bladder. On the second day the dressings were charged with a profuse flow of greenish-colored fluid from fistula. On the fourth day again dressed; while probing the bladder this day he detected and removed two stones. On the seventh day he found and removed five stones, one as large as the end of the finger. None were found subsequently. He was satisfied that contraction of the common duct

existed, rendering it too small in caliber to carry off the biliary secretion, and that for the time being the fistula would have to be maintained open. Had this been evident on the occasion of passing the sound, Parkes might doubtless have adopted the suggestion that, "in case any communication with the duodenum exist, however small it may be, dilatation of the ductus choledochus should be attempted."

Notwithstanding the assurance of Parkes that his finger in the abdominal cavity guided the sound through the cystic and common ducts into the duodenum, and the statement of Sims in the autopsy of his case, that "Ganal was able to pass a probe from the gall-bladder through the ductus communis choledochus into the duodenum," Barthoolw questions the practicability of catherization and consequent dilatation of these ducts. While I encountered this difficulty in the post mortem of one dog, numerous other examinations made in dogs presented no obstacle to the passage of a sound from the gall-bladder through the cystic and common ducts into the duodenum. While a straight metallic probe may not pass readily from the cystic into the common duct. there is no embarrassment in carrying a curved sound or an elastic bougie from the gall-bladder into the duodenum, and hence in cases of partial constriction of either duct, the successive use of graduated sounds or bougies may be relied upon for dilatation of the passages.

It is clear that an effort should be made to overcome temporary obstructions of the ducts. If concretions cannot be moved in either direction by pressure from without the canal with the fingers, an effective recourse is the expedient of Tait, crushing the masses with padded forceps, and leaving the fragments to be flooded out by the bile. This suits cases not requiring incision of the sac, but he is in favor of establishing biliary fistula temporarily, and a large fenestrated drainage-tube should be inserted, while the whole abdominal wound is securely closed excepting at the opening for the attachment of the incision in the sac. A compress and bandage should be used to obviate any tendency to ventral hernia after the operation. Keen also regards the creation of a biliary fistula as the better practice, yet holds that in case a probe could be passed into the duodenum with reasonable assurance that all stones have been removed, closure of the gall-bladder by Gèly's suture or otherwise might be done with propriety.

Comparing the different measures for relief of a distended gall-bladder, we find that the relative advantage depends upon the probability of restoring the bile to the intestines. If a stone remain in the cystic duct, the sac will be refilled with its own secretion, and if in the common duct, by bile; but should all the stones be removed and the ducts be pervious, the fistula will soon close under the use of drainage through the duct into the duodenum. Should the bile be certainly restored to its natural channel on the occasion of operation, the closure of the incision in the sac and dropping it into the abdomen, with complete suture of the external wound, are advisable. Besides the case of Bobbs, in which only one stitch was used to close the incised sac, those of Courvoisier and Bernays, operated on by this method, have proved entirely satisfactory. Even the fatal case of Meredith, in which the incision of the gall-bladder was closed with the continued suture and dropped into the abdominal cavity, proved the feasibility of immediate closure under favorable conditions. In the report of it the author states that this patient died in forty-eight hours with suppression of urine. "At the autopsy the incision in the gall-bladder was found securely closed, and quite impervious to fluid." The case of Dr. Courvoisier died from pneumonia two and one-half months subsequent to the operation, and the autopsy showed a perfect union from the suture of the incised wall of the gall-bladder.

There are some cases in which complications such as extensive disorganiation, the agglutination of tissues or the evidences of malignant disease, preclude the completion of an operation. Of the last Senn reported an interesting case to me on February 11, 1885. A parallel case has been reported since in Germany, and though, as Senn states, primary cancer of the bile-duct is an exceedingly rare occurrence, scirrhus of the pancreas and pylorus often involves it in the disease.

When the outlet of the common bile-duct is permanently closed, and the bile finds its way from the hepatic duct through the cystic duct into the gall-

bladder, the most philosophic proceeding is to effect a direct passage of the bile from the gall-bladder into the duodenum.

In my first series of experiments upon dogs for testing this union of the gall-bladder and duodenum, a circular row of catgut continuous suture attached the serous membranes around an elastic ligature connecting the two walls. This was done under the impression that it was requisite to excite adhesive inflammation, by which the surfaces should become agglutinated. But it was productive of undue disturbance, and in the last case of that series it was observed that sufficient inflammatory action ensued from the insertion of a single stitch of silk thread to unite the walls of the gall-bladder and duodenum.

With the further observation that this loop cut an opening between the two cavities, in case an incision be made into the sac for exploration, it may be closed by Lembert's suture separate from the parietes of the abdomen; and the external wound may then be sutured throughout without any provision for drainage, as the bile passes very soon through the apertures of the thread and ultimately through the fistula.

With a view to diagnosticate distension of the gall-bladder, all tumors connected with the liver should be examined with care. A peculiarly complicated case of laparotomy is reported by Bauer (*St. Louis Med. and Sur. Jour.*, June, 1886) in the person of a mechanic aged forty.

This case was calculated to mislead the operator, in view of the fact that "immediately below the right hypochondrium there was a tumor obviously connected with the liver, since it moved contemporaneously with that organ. It presented a semi-globular form, about three inches in diameter, was smooth and elastic to the touch, and withal very tender." The author leaves us entirely in doubt as to his preconceived view by saying that although he had formed some diagnostic views on the nature of the tumor, believing that laparotomy is the only trustworthy diagnostic method, he proceeded to operate.

[Query—What does an analysis of the facts prove? Abscess of Liver!]

Fatal obstruction of the ilio-cecal valve by a gall-stone is reported by Dr. Russell H. Johnson, who states that, "the facts of the case warrant the conclusion that the gall-stone under consideration escaped from the gall-bladder by means of a fistulous tract connecting it with the duodenum," and that, "autopsic examinations (especially those made by Murchison) have in many instances shown the presence of these fistulas and lead us to infer that it is not a very unusual occurrence."

Dr. Peters, detailing to the New York Surgical Society the results of an autopsy, illustrated strikingly this ulcerative tendency from an occlusion of the gall-bladder and the accompanying adhesions surrounding the perforation into the duodenum by which nature provides an outlet from the gall-bladder into the duodenal canal.

It is evident that the slow progress of such cases at the outset, and the gradual concretion of hard masses in the gall-bladder, favor the development of a subacute form of inflammation, which leads to suppuration in the sac and ulceration of adjacent tissues. The inflammatory action which is sometimes set up in the tissues of the gall-bladder seems to point to relief in the direction of the duodenum, and an autopsic observation of the ulcerative process by which the contents of the gall-bladder passed into this canal first directed my attention to the practicability of effecting a direct communication between these two organs.

No measure apart from that of Von Winiwarter had been adopted previously with a view to convey the bile from the gall-bladder into the intestinal canal. In his case the gall-bladder was first united to the colon, and after the lapse of some time he established a fistula between the sac and the small intestine by uniting them with stitches, suturing the intestine to the abdominal wall, and opening the gut on the fifth day, puncturing the opposed surfaces through the incised intestine, and finally closing the latter with sutures. This operation of Winiwarter was intended to remedy the occlusion of the common bile-duct by effecting an artificial communication with the intestine for the passage of the bile, and while it failed to realize the advantages expected from a cholecysto-duodenal outlet, the partial success of this procedure shows the tolerance of similar measures by the respective structures involved. No com-

plications arose in Winiwarter's case from the coils of intestine, the constriction of its lumen, or the regurgitation of its contents into the gall-bladder; and much less are such difficulties likely to occur in the attachment of the sac to the duodenum.

The practical discernment of Harley led him to the conclusion that the triumph of operative surgery would be to establish an artificial fistula between the gall-bladder and the duodenum. For then not only would the pent-up bile be removed, but the disturbance arising from the non-admittance of bile into the intestines likewise be at the same time overcome. "I am not quite sure," he remarks, "if, in these days of antiseptic surgery, the operation is not quite practicable; for I can see no reason why the adjacent surfaces of the gall-bladder and duodenum should not be eroded by potassa-fusa and speedily stitched together."

The principle of cholecysto-duodenal communication seems to have been grasped in this suggestion for creating a fistulous opening; but the process of accomplishing it presents objectionable features, which do not hold against the plan of uniting the two walls by a loop of suture which shall induce an amount of adhesive inflammation sufficient for the union of their outer surfaces, with a certainty of cutting through the adjoining tissues and effecting a passage for the bile from the gall-bladder into the duodenum.

Harley is justly entitled to the suggestion 'to establish an artificial fistula between the gall-bladder and duodenum." But it is proper to note the difference between a predetermined recourse to the ligation for opening a communication from the gall-bladder into the duodenum, which shall at the same time induce a firm union of their outer surfaces, and an incidental attachment of the sac to the large or small intestine, as done in his case. It must be perceived that his mode of proceeding has quite a dissimilar effect from the operation that was suggested by Harley, or from that process which I adopted afterwards for establishing the flow of bile into the duodenum, which McGraw has indorsed.

The close proximity of the duodenum to the lower and under surface of the distended gall-bladder, with more or less thickening of its wall, affords favorable conditions for this operation; and it is evident that greater tolerance of the textures for surgical interference is presented after the disorders connected with biliary obstruction have diminished the tendency to active or acute inflammation.

A class of operations calls for attention in connection with impaction of biliary calculi in the cystic or common ducts which cannot be dislodged by the means already mentioned. The incision of the wall of the duct by the knife or scissors, constituting this operation for the removal of stones, has in most cases been closed afterwards by suture, but when this is impracticable it may be left open and the intervening space should be packed with gauze, leaving the ends protruding at the external wound, to afford drainage and prevent the entrance of bile into the peritoneal cavity.

The various modes of procedure adopted by different operators in effecting cholecystenterostomy include anastomosis of the gall-bladder with the duodenum, the small intestine and the colon, by different processes besides that of union by a stitch of silk thread or the elastic ligature.

The attached surfaces have been sutured, with the cut edges brought together or the division made after nearly completing the circuit. The bone-plates have been employed to approximate the walls of the gall-bladder and intestinal canal, and the Murphy button has latterly been used in most cases for this anastomosis.

There has been a fair measure of success by each of these procedures, and the choice of operators in the future will depend to a considerable extent upon the conditions presented in the individual cases.

The Key of Death.

The "Key of Death' is shown among the weapons in the arsenal at Venice. It was invented by Tibaldo, who, disappointed in love, designed this instrument for the destruction of his rival. The key is so constructed that the handle may be turned around, revealing a small spring, which being pressed, a very fine needle is driven with force from the other end. This needle is so fine that it leaves no mark; while the death of the victim is almost instantaneous.—*Curious Questions.*

PERISCOPE.

Operations without Anesthesia. — Dr. J. J. Buchanan, surgeon to the Pennsylvania Railroad Company, at the meeting of the National Association of Railway Surgeons, presented the following conclusions: 1. Patients with limbs so crushed as to require amputation, who are in good general condition, should be operated on at once. 2. Those who present evidences of severe shock and great loss of blood, should be treated by external heat and stimulants, including the hypodermatic use of whisky, digitalin, strychnin, and nitro-glycerin, and the rectal injection of whisky, strong coffee, and hot water. The crushed limb should be disinfected as completely as possible, and six per thousand saline solution of not less than two quarts for an adult be allowed to flow into a vein, this infusion to be repeated, if necessary, at intervals of a few hours, according to the effect produced. 3. If by these efforts complete reaction should be established, anesthesia and amputation should be proceeded with as in ordinary cases. 4. If, however, a moderate or doubtful reaction only should occur, the propriety of a rapid amputation without anesthesia should be seriously considered, if the consent of the patient be gained. 5. The complete disinfection of crushed, lacerated, dirty, and infected limbs usually cannot be accomplished. 6. The sooner such limbs are removed the better, provided the patient's life be not lost in the operation. 7. If, notwithstanding the vigorous treatment just mentioned, an amputation, either with or without anesthesia, be fraught with great risk, it is far better to disinfect as thoroughly as possible, drain well, pack all open spaces, and take the chance of infection, which, in most doubtful cases, is probably less than the risk of death from shock following operation.—*Health.*

Surgical Shock and Hemorrhage.—Chase (*Am. Jour. Obst.*) maintains:—

1. The treatment of shock should be preventive and curative, and to a large degree the indications for the former define the lines of treatment in the latter.

2. The proper exhibition of preventive measures includes a careful study into the functional activity and organic status of all important organs, and such treatment by hygienic, dietetic and therapeutic measures as will elevate the standard of bodily and mental health to a degree in which the maximum power of resistance may be produced and maintained.

3. Special emphasis should be given to lithemic and uremic excretion, and the condition of the circulatory and nervous systems.

4. Knowledge as to inherited power of resistance to and recovery from serious diseases and accidents is of the highest value in determining the course of procedure and estimating the chances of recovery after capital operations.

5. A supply of facilities and drugs for meeting all emergencies should be in constant readiness, with exact knowledge for the indication, dosage, physiologic and therapeutic effect of special heart tonics and stimulants, which include strychnin, digitalis, spartein, nitroglycerin, brandy and codein.

6. Limit the time of an operation to the shortest period compatible with thorough work and proper technic.

7. Save your patient from the shock of fear to the utmost, and in selected cases proceed to operation without informing the patient of your purpose.

8. In shock with hemorrhage supply the volume of venous and arterial loss by direct transfusion of normal salt solution into the patient's vein.

9. Bear in mind the influence position has on the circulation under both shock and hemorrhage, especially in anemic conditions of the cerebro-spinal nerve-centers and the heart.

There are few things without their uses in this world, and we now rejoice to find that the burglar has his uses as an involuntary agent in a surgical operation. Professor Brouardel in a recent lecture related the following case. A man had a pharyngeal abscess so deeply seated that his medical attendant was afraid to meddle with it. One night a burglar broke into the house, and on the sick man calling for help tried to throttle him. The abscess burst, deluging the burglar with pus and causing him to make a rapid exit. His intended victim, on the other hand, experienced instant relief, and made a rapid recovery.

A curious story in relation to hereditary suicide comes to us from Paris, which we give on the authority of Professor Brouardel. A farmer killed himself by hanging, leaving seven sons and four daughters. Ten of these eleven children, after they had each brought up families, took their own lives, and their several offsprings also committed suicide by various means and at various ages. The remaining survivor of the original eleven children is now a man sixty-eight years, and is supposed to have passed the probable age of his family's suicidal tendencies—at any rate, it is only charitable to assume so.—*Health.*

The *Sanitarian* warns women against the various **antiseptics sold to preserve fruit.** Salicylic acid is the main substance of which they are composed. Salicylic acid is a powerful antiseptic; it hinders or prevents fermentation, the souring and putrefaction of milk. It completely arrests the conversion of starch into grape sugar. This action is directly opposed to the process of digestion, and for this, if no other reason, its use should be universally condemned. The use of the acid has been condemned by most of the European countries having pure food laws. In France it is forbidden. In Austria, Italy and Spain it cannot be used without the danger of incurring a heavy penalty, and all South American States having poor food laws have absolutely forbidden its sale. The laws of many of the States forbid its use. Its use in food is prohibited in Pennsylvania.

Preservatives, under various high-sounding names, intended for use in private families, and said to be perfectly harmless, are on the market. Salicylic acid is their main ingredient. The conscientious and careful housekeeper should put an absolute veto upon the use of any such compound. There is rarely any need for them, since when pure fruit and vegetables are used and the proper directions for sterilizing by heat, etc., are carried out, canned or preserved goods of all descriptions can be prepared that will remain in good condition for years without the aid of any preservative whatever. Any good housewife who has an inkling of hygiene takes a womanly pride in putting up her fruits in a hygienic way and trusts to no short cut to save a little trouble and care. She knows that in the end it costs more and endangers, to some extent, the health of her family and herself. It is only the slipshod, don't care, careless, or ignorant woman who uses the cheap drugs to preserve her fruit. —*Health.*

The annual report of the New York State Lunacy Commission for the year 1896, recently presented to the Legislature, gives **the whole number of registered insane** on that date as 20,869, a net increase of 653 over the preceding year. The total amount expended for maintenance was $3,052,952.87; and the expenditure for new buildings, repairs, and improvements was $829,466.43. —*Med. News.*

A French surgeon has been fined and imprisoned for causing the death of a patient in doing a laparotomy, and leaving a pair of **forceps in the abdominal cavity.**

Ward recommends the following prescription for use **against round worms:**

Santonin	gr. iii.
Hydrarg. chlor. mitis	gr. x.
Sacchr. alb.....	q. s.

M. Ft. chart. No. 2. Sig. For a child, three to six years old, one powder on retiring, and the other in the morning, fasting.

The Treatment of Sprains.—Injuries classified as sprains fall, on closer inspection, under one or more of four headings. These are contusions, ligamentous injuries, synovitis of the joint and teno-synovitis of the muscles near the injured joint.

The treatment which has been pursued is as follows: The mildest cases have been satisfactorily treated by daily massage and bandaging. I have never used immediate massage in severe sprains, perhaps from a feeling of timidity, but partly because I have seen cases of recent sprain made decidedly more acute from the application of massage in presumably competent hands. At the City Hospital we have facilities for massage, but in my term of service I have limited it wholly in the severer cases to the time when heat and extreme sensitiveness have disappeared and when it seems to me desirable to stimulate the local circulation. Our hospital out patients recover more quickly and more completely than before we had massage facilities.

Taking the ankle-joint as a type in acute sprains, I have been able to obtain the best results by the immediate application of wet mill-board strips applied over several layers of sheet wadding and bandaged tightly but evenly. This dressing is left undisturbed, except for additional roller bandages applied outside, for two or three days. At the end of this time, if the swelling has disappeared for the most part, if the sprain was a severe one, a circular plaster-of-Paris bandage is applied from the toes to below the knee. This bandage is split and removed every two or three days to note the progress of the joint. With the subsidence of the acute symptoms massage is begun, and the plaster at once reapplied for twenty-four hours. The plaster is discontinued gradually, to be replaced by a flannel bandage. Douches of hot and cold water are used in connection with massage.

The aim of the treatment is at first to quiet the general and local circulation by general and local rest, and thus to limit the effusion and joint irritation, and then at the earliest moment to revert to stimulating measures and restricted use of the recovering joint.

The immediate application of plaster-of-Paris is objectionable, because in twenty-four hours the swelling subsides somewhat and leaves the plaster loose; or, if the swelling increases, discomfort or constriction may occur.

Half-way measures have little to commend them. Cotton bandages and hot water, however faithfully applied, are but poor makeshifts. Sticking plaster is better, but lacks precision, although affording a partial fixation; and in the ankle, applied as a figure-of-eight bandage, it often affords excellent support. But, in general, it may be said that a sprain is either slight enough to be treated by massage from the first, or severe enough to receive for a day or two, at least, the most complete and efficient fixation.—*Boston Med. and Surg. Journ.*

The necessity for a **pay hospital for contagious diseases** in Philadelphia has long been shown by the public prejudice against the removal of patients to the Municipal Hospital, where there are practically no facilities for private treatment. It is not always possible to isolate cases of contagious diseases in a private house, and there is no institution where patients can be treated by their own physician and at the same time be isolated. The hospital needed is designed to be of especial service to patients taken sick in boarding houses, hotels or apartment houses, who are deprived of the comforts and conveniences of their own residences, and would gladly enter and pay an institution of this character in preference to being taken to the Municipal Hospital.

Those who have been laboring for the last three years to establish such a hospital recently held a meeting at the Mayor's office to take final steps before making application for a charter and beginning actual work. The movement was started by the Woman's Health Protective Association, and, in conjunction with a committee of the County Medical Society, public attention has been directed to the project. It has been determined to call the hospital the Health Protective Hospital for Contagious Diseases, and the announcement is made that a site has been secured by the purchase of property at Twenty-second street and Lehigh avenue, opposite the Municipal Hospital.

The following become incorporators of the institution: Mayor Warwick, Mrs. Mary E. Mumford, Judge Ashman, J. Rodman, Paul, Dr. T. Hollingsworth Andrews, Charles E. Richardson, Judge Beitler, John H. Scribner, Dr. George M. Gould, Dr. George Strawbridge, Alba B. Johnson, Judge Sulzberger, Dr. Alfred C. Lambdin, George Wood, Lawrence McCormick, Charles M. Lea, Dr. John K. Mitchel, Robert Alexander, Mrs. John H. Scribner, Dr. Frederic P. Henry, Dr. Clara T. Dercum, Dr. Edwin E. Graham, Mrs. Olive Pond-Amies, Dr. James Tyson, Dr. Eleanor C. Jones, Dr. John H. Musser, Rev. Dr. Henry Krauskopf, Rev. Dr. Joseph May, Rev. Dr. Henry C. McCook, Archbishop Ryan, Mrs. Charles E. Pancoast, Rev. Dr. William McVickar, Dr. Mary E. Allen, Dr. Edwin Rosenthal, Miss Elisa W. Redfield, Secretary Joint Committee; Dr. J. Madison Taylor, Treasurer.

The recent warm weather in the South has had but little ill effect in relation to the yellow fever epidemic. New cases are reported in rapidly diminishing number, although the per cent. of deaths seems to be increasing. This, however, is usual toward the close of an epidemic. The New Orleans Board of Heauth announce that it is now perfectly safe to enter the city, and at Memphis (following heavy frosts) all quarantine restrictions have been raised. Regarding the recent scare, the *Memphis Med. Monthly* says: Since the outbreak of yellow fever, legions of so-called "experts" have sprung into existence, and have foisted themselves upon press correspondents and a patient public to such extent that there is really a possibility, that there are now more experts than there are or have been yellow-fever patients. These gentlemen have been all so antagonistic in their diagnoses, and have so freely expressed themselves pro and con whenever a fresh outbreak of fever was reported, that the poor befuddled public hardly knew what to believe.

For Acute or Sub-acute Cystitis.

Ext. buchu fl.....	oz. i.
Potassii citratis	dr. iii.
Spt. etheris nitrosi.....	oz. ss.
Syr. limonis, q.s. ad.....	oz. iii.

M. Sig. Teaspoonful in water every three hours.

NEWS AND MISCELLANY.

The following statistics concerning **smallpox and yellow fever** have been received in the office of the Supervising Surgeon-General of the U. S. Marine Hospital Service during the week ended November 20, 1897.

YELLOW FEVER—UNITED STATES.

ALABAMA.

Flomaton, Nov. 17, 1 case—0 death.
Mobile, Nov. 13-19, 13 cases—1 death.

LOUISIANA.

New Orleans, Nov. 14-19, 49 cases—12 deaths.

MISSISSIPPI.

Biloxi, Nov. 14-19, 6 cases—1 death.
Clinton, Nov. 13-19, 3 cases—0 death.
Edwards, Nov. 13-19, 5 cases—1 death.
Sranton, Nov. 13-19, 11cases—1 death.

YELLOW FEVER—FOREIGN.

CUBA.

Manzanillo, Oct. 17-31, 5 deaths.
Matanzas, Nov. 3-10, 2 deaths.

JAMAICA.

Port au Prince, Nov. 10, 1 death.

SMALL POX—UNITED STATES.

GEORGIA.

Atlanta, Nov. 14-17, 26 cases—1 death.

Expressed in time units, the distance between Cape May, N. J, and Philadelphia, is 100 Minutes—measured by the "Century Flyer" over the route of the South Jersey Railroad.

This, and like marked reductions in time to other points, in connection with the superior modern equipment, splendid service, and capable management maintained by the railroad, easily accounts for recent great increase of travel to the health resorts along the southern coast of New Jersey.